THE BUILDER

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WITH WHICH IS INCORPORATED "THE BRITISH ARCHITECT."

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SPECULATIVE HOUSING.

OF all problems concerned with building, that of housing the people is incomparably the chief. The broader aspects of town planning, the provision of light and air, and the means of ensuring beauty and amenities in our towns and new suburbs merge into one great question which we must face squarely. The present state of inaction obviously cannot be allowed to exist much longer; sooner or later we shall have to choose one of the many roads that lie open to us, and select some definite and more or less permanent policy for housing "the working classes." There are signs that the public is realising the importance of dealing with the question, and as a general guide to the situation we recommend Mr. Walter Cook's address on "Speculative Building as affecting the Housing Problem,"* which is to be published in pamphlet form, and an abstract of which we give on page 423.

We have heard and read many dissertations on the future of housing that dealt solely with the financial aspect and that overlooked the spirit of service—the inspiration—that must lie behind any movement of true value, and we have also come across somewhat fantastic proposals that apparently left finance out of account altogether; our true path must lie along a reconciliation of these differences, and it is Mr. Cook's serious attempt to discover this path that gives his message peculiar value. He addresses himself to all those engaged upon the production of buildings, from the architect to the general labourer, reminding them that they are all part of one great body, that all their efforts can produce nothing without the driving force of an ideal behind them, and that *esprit de corps* is as necessary in the occupations of peace as in the life of an army.

The first difficulty is clearly defined:—"It is important to remember that there is a considerable section of the community (apart from the wastrels of society) consisting of people who cannot for various reasons afford to pay economic rents." It is wrong and short-sighted to say that these people must put up with any accommodation that they can find. To underhouse or to house in bad conditions this great section of our population is to mortgage the future, to breed an under-people, and such a policy merely shifts expenditure from housing to workhouses, hospitals, asylums, and prisons. Mr. Cook assumes that philanthropy alone can deal with this, and passes almost at once to a consideration of those who, either directly or indirectly, can afford to pay the full rent. It is, nevertheless, evident that the position of those who cannot pay an economic rent will require early and earnest consideration; the clearance and remodelling of slums, for example, is a national problem of the first order, and one that cannot conceivably be left to the caprice of the philanthropist.

As a principle, subsidisation of rent is unsound; it has the defects of payment in kind, and in removing responsibility it produces demoralisation. It also presupposes that the circumstances of the tenant cannot improve, and thus it creates a "propped" section in the community. The payment of rent can only be faced squarely by raising the income to meet it; in other words, a sound industry should be capable of paying for adequate housing. If we ignore this fundamental truth the responsibility that should rest with industry is transferred to the public purse. If subsidisation has to be, it should take the form of supplementing income rather than of complicating and disguising facts.

We now pass to the needs of those who, directly or indirectly, are able to pay an economic rent. Mr. Cook has come to the conclusion that the chief necessity is to take such steps as will ensure a wide increase in the purchase and ownership of houses by occupiers, that the majority of these do not possess sufficient capital to purchase their houses, and that provision should be made for advances to such occupiers, leaving them to repay the principal by such instalments as are within their resources. The advantages of each man occupying his own house are great; the stability of the country is increased, one of the main causes of friction and unrest is removed, and the Government would be well advised to direct legislation with that end in view. The danger lies in encouraging an excess of originality in building and (as we have found with the Grant to Private Persons) there is a tendency for each man to think only of himself and not of the effect of his work upon the neighbourhood generally. A hotch-potch of houses and bungalows confusedly jostling each other is not much better than the Victorian terrace, and any legislation that is passed which aims at assisting people to own their houses should contain clear and absolute safeguards that future house building shall proceed along organised lines, and that any given area shall be planned as a whole and interlinked with its surroundings. This necessity intensifies our difficulties, but its recognition must be regarded as a *sine qua non*. Without foresight and co-ordination we can only erect inconvenient and inchoate ugliness that posterity will have to pull down and rebuild at great expense. We reiterate this aspect of the problem because both the Government and the public may be tempted to seek a way out of the impasse by adopting a plausible but ephemeral palliative in the form of ill-digested and unsatisfactory house building.

We have frequently urged the importance of utilising architectural advice in housing work, and Mr. Cooke specially draws our attention to "the desirability of promoting the closest co-operation of the architect with the independent builder," and continues, "in providing the smaller houses at a reasonable cost it would not, of course, be practicable to pay the usual architectural fees on the full value." It is obvious that the architect ought to occupy his legitimate place in designing the small house and in laying-out a housing scheme, and it is equally clear that some special arrangement must be made between the architect and the builder if this is to be brought about, and yet the fatal lethargy, by no means the monopoly of Government departments, seems to clog the wheels of progress in this direction; we have heard no more of the proposed meeting that was to have taken place to discuss the situation from the points of view of the two parties mainly concerned. Such a conference should be arranged by the Royal Institute of British Architects and, in the national interests, we look to that body to take action.

The solution of our housing problem should be found in the provision of houses by the small builder, working with his men, but he must be given architectural advice at the lowest possible rates, at rates that would be "economic" through the increased value of the better designed houses; the State could then assist occupiers to purchase their own houses by the issue of loans and in preventing the exploitation of land values. The next step lies, it would appear, with the representatives of the architectural profession.

* Copies of pamphlet can be obtained from No. 4 Catherine-street, price 2/6, post free 2/9.

NOTES.

House Costs. THE National Federation of House Builders has issued a manifesto (see p. 418), disputing the Ministry of Health's figures of the cost of house building. The Federation considers that these are too low and consequently misleading; it points out that the Ministry's prices do not include land, roads, or sewers, and that the Government houses are of a low standard, both in accommodation and as regards finish generally, and it is suggested that house building is, in reality, likely to become stabilised at a little more than double pre-war costs. In a wrongly-directed attempt to keep down the cost, the Ministry has from the start adopted a ludicrously pinchbeck attitude towards fittings and internal amenities, and in trying to save threepence here and sixpence there it has as a rule seriously impaired the value of the house. This policy has become increasingly pronounced of late, and has even spread to tampering with the accommodation; but, as regards the exteriors, the design of Government houses has always been, and still is, simpler, and consequently in every way better, than the average "villa"; the Federation's references to "individuality" and "little embellishments" constitute, therefore, a danger signal in a manifesto with which in most respects we are in agreement.

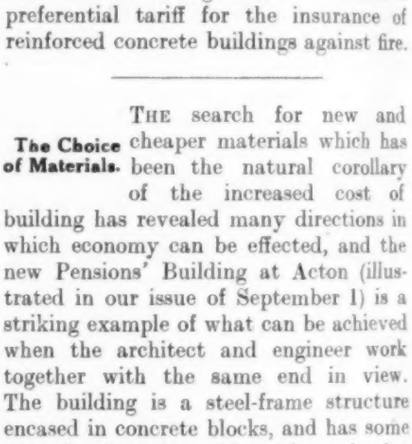
Comparison of House Values. THE timely warning issued by the Federation as to the unwisdom of taking the cost of a Council cottage as a criterion of the cost of an ordinary villa, also points out that the one is "a mass-production article with every little embellishment ruthlessly cut away, and the other has the individuality, the comforts, and the convenience of a home." It might have been added that the contracted area of the cheap Council cottage latterly erected would be found very unsatisfactory to anyone who desires to have a comfortable home. The Federation also says that the statement attributed to Sir Charles Ruthen that the cost of building is now 60 to 70 per cent. above pre-war cost is inaccurate and misleading.

Homes as a National Asset THE making of a home is a natural and commendable instinct, no less to men than other animals, and is surely to be encouraged by all who desire to develop the integrity and security of the State. It is a curious kind of topsy-turveydom that we have been providing a great number of working-class cottages at an impossible cost just when, as a nation, we could least afford it and for many years we shall feel the heavy burden. But it matters not what the condition or status of the individual may be, a comfortable home is one of the most desirable of all possessions, and it is most important in the interests of the State that the greatest possible number shall be enabled to possess one. We may even come to realise that there is a large lower-middle-class population very valuable to the well-being of the country, which ought to be encouraged to secure more of the amenities of existence, though not politically of so much account as what are known as the working-classes. Hard-working and well-balanced citizens who have no trade-union to look to for help should be much concerned to discover how they may possess comfortable homes without having to appeal to charity.

Church Building of To-Day. THE forthcoming Church Congress turns one's thoughts to the consideration of ecclesiastical architecture and the regard it holds in the minds of churchgoers and church authorities. The examples set in the great Byzantine Cathedral of Westminster, and similar essays on a smaller scale elsewhere, do not appear to have set a fashion for many church builders. The associations and traditions and the present day ritual do not seem to find much real satisfaction outside the style of Gothic art. Gothic architecture was the expression of a deep religious feeling, translated into building forms through a zealous priesthood, which was able to employ fine craftsmen at a very cheap rate. How far does a great modern Gothic church express the religious feelings of the modern public? It is hard to say. But we cannot ignore the fact that the chief reason why our modern domestic art has reached such a high level of excellence is because of the sympathy and intuitive love for the subject which are to be found to-day, both amongst the owners and makers of houses. The undoubted ability with which many modern business buildings are designed and executed cannot naturally evoke a similar sentiment to that which is found in domestic work, but we believe some at least of our modern architects could impart into business premises some of the nobility and distinction which may be found in old Italian palaces if the demand made itself felt. Who shall analyse the various motives which have made it possible to create so noble a building as the Liverpool Cathedral? Is there enough genuine religious feeling to again make possible the former busy days of church building?

Fire-Resistance of Concrete. THE paper on the "Fire-Resistance of Concrete," presented by Professor F. C. Lea and Mr. R. E. Stradling at this year's meeting of the British Association (an abstract of which is given in this issue), comes at a time when the fire-resisting properties of concrete are receiving considerable attention. Extensive tests carried out in this country and abroad have demonstrated the superiority of reinforced concrete as compared with other materials when subjected to intense heat, a recent series of experiments carried out by the United States Underwriters' Laboratory showing that, whereas some of the specimens of steel columns with various coverings failed under two hours, not one of the reinforced concrete columns subjected to the same heat failed under 7 hours 23 minutes. In view of these experiments a strong effort is now being made to obtain a preferential tariff for the insurance of reinforced concrete buildings against fire.

The Choice of Materials. THE search for new and cheaper materials which has been the natural corollary of the increased cost of building has revealed many directions in which economy can be effected, and the new Pensions' Building at Acton (illustrated in our issue of September 1) is a striking example of what can be achieved when the architect and engineer work together with the same end in view. The building is a steel-frame structure encased in concrete blocks, and has some 1,500 ft. of cornice, with a 4-ft. projection



Doorway in High-street, Warwick.

Bench End in the Exeter Chapel, St. Martin's, Stamford.

at roof level. Considerable attention was given to the design of this cornice, and it was found that by the use of hollow concrete beams for the long runs and reinforced concrete for the corners it could be erected at about one-tenth of the cost of a stone cornice of the same dimensions—a very considerable saving on so large a cornice. A Canadian contemporary just to hand contains a similar instance, in which a saving of 15,000 dollars was made by the substitution of concrete for stone for the cornice of a new hospital at Victoria, B.C.

College of Estate Management.

THE announcement by the Governors of the College of Estate Management that His Majesty the King has graciously approved the grant of a Royal Charter to the College marks a further stage in the success of this College since its inauguration by the Auctioneers' Institute a little over two years ago. In founding such a College the Auctioneers' and Estate Agents' Institute were but following in the steps of those learned professions which supervise and control the education of students for their own professions. Contained in the grant of this Royal Charter is a reconstitution of the governing body, which increases still further the scope of the College, as the new Governing Body will now include, for the first time, representatives of the Surveyors' Institution. The College, therefore, has now passed under the joint direction of the two great Institutions connected with the profession of the land. Coincident with this broadening of the controlling interests in the College comes the decision of the Governors to enlarge their sphere of activities by the inauguration of Provincial Centres in some of the largest towns of the Kingdom where lectures will be given to those students who are unable to attend the Headquarters of the College for their work. During the past year students of the College numbered over 1,100, and there is every indication that these figures will be surpassed in the coming year.

Pictures Under Glass.

THOUGH this correspondence has been proceeding for a considerable time, it does not appear that any conclusions suggesting that a substitute for glass is possible, or that any adequate means for preventing the reflection which the glass sets up can be secured. This reflection from the glass is felt more in the case of dark pictures—in pictures wherein the finest effects of chiaroscuro are obtained—and is felt less in pictures of more decorative and flat treatment. At the same time, it may be hazarded that to risk some loss from the effects of atmosphere by exposing the pictures wherein most reflections are set up, is better than to leave them under glass in conditions where they cannot be seen properly at all. We must conserve our pictures, no doubt, but at the same time their purpose is to be seen, and the best masterpiece is better valued in an insecurity, which yields up its beauties to us, than a security which hides them away. At the same time it can be affirmed that glass sometimes improves a picture, giving it a certain detachment which, though slight is, as it were, a sanctuary set round it. But there is another side to all this. It is rather inconsistent, owing to our values being so muddled, that while we set so much store on preserving our national pictures, we set so little on purifying the atmosphere of our great cities. If we adopted the means that are available for purifying the air, most of the danger in exposing pictures to view without glass would be removed.

Barking Old Court House.

WE regret that the Barking Town Urban District Council should have decided that public money should not be spent on the restoration of the old Court House at Barking. As is pointed out by the Hon. Secretary to the Essex Archæological Society, the building is of very much greater interest than Hazeleigh Church, and we wish that necessary funds could have been forthcoming to preserve a building of so much antiquarian importance. The only possibility of its preservation now depends on the necessary funds being obtained through other sources within three months, and should they not be subscribed, the Council will proceed with its demolition.

St. Clement Danes, Strand.

IT must have happened to many as they passed to and fro on their business along the Strand, to glance up at this delightful little church cloistered on its island site, round which the tide of life roars so incessantly. And the pleasure is enhanced just now when the September sun lighting up its walls reveals the green trails of ivy spreading delicately over them, making in combination with the grey of the stone work bright patches of colour. In such circumstances this reappearance of nature in a locality so remote from its influence, seems to wrap the church in a more human atmosphere, and, providing its activities stop short of gutters or other trespass, may we not be allowed to enjoy this delight to the eye, and hope that the severities of architectural purism will not intervene against its liberties, which give such charm to the church? We have lingered with pleasure to glance at these bright trails of ivy so gracefully wrapping the building, which in such a place have all the charm of some unexpected sound in nature, or scent wafted along the air.

Bench End, Bolton Church, Lancs.

GENERAL NEWS.

Professional Announcements.

Mr. A. C. Holliday, A.R.I.B.A., who was engaged in research work and was joint editor of the *Town Planning Review* in the Department of Civic Design, University of Liverpool, has been appointed civic advisor to the City of Jerusalem.

Mr. William Fishwick is carrying on the business of the late Mr. William Windsor, quantity surveyor, 37, Brown-street, Manchester.

After the end of September the office address of Mr. G. Thrale Jell, A.R.I.B.A., will be 20, Hanover-square, W.1. The telephone number will be: Mayfair, 560.

Mrs. M. A. Cloudesley Brereton, editor and consultant, British Commercial Gas Association, has removed to 58, Romney-street, Westminster, S.W.1. Telephone: Victoria, 8342.

Obituary.

The death occurred on September 16 of Mr. Cyril Cliff Cheek, A.R.I.B.A., of 130, Marina, St. Leonards-on-Sea, at the age of 82.

The death occurred on Saturday last, at his residence, "Glastonbury," St. Margarets-on-Thames, of Mr. Septimus Cecil Searle, A.R.I.B.A., in his 69th year. The late Mr. Searle was senior partner of Messrs. Searle & Searle, of 34, Paternoster-row.

Ancient Monastery Found.

According to the *Times*, the remains of the ancient monastery of Nendrum, on Mahee Island, Strangford Lough, have been brought to light through the agency of the Archæological Section of the Belfast Natural History and Philosophical Society. The foundation of the monastery is generally dated at A.D. 450, before which date it is practically certain that it was a pagan settlement.

Peebles War Memorial.

It is announced at Peebles that Field-Marshal Earl Haig will unveil the County War Memorial in the Chambers Institution quadrangle on October 5. A memorial hospital, which also forms part of the scheme, will be formally opened by Mr. Robert Munro, Secretary for Scotland.

Municipal Honour.

Alderman W. C. Fenton, J.P., F.R.I.B.A., has been invited to become the next Lord Mayor of Sheffield. Mr. Fenton is a Past President of the Sheffield, South Yorkshire and District Society of Architects and Surveyors, of which he was a founder and the first Hon. Secretary.

R.I.B.A. Exhibition of Contemporary British Architecture.

Before forwarding their drawings and photographs to the R.I.B.A., intending exhibitors are requested to apply to the Secretary R.I.B.A. for a copy of a printed form which they are asked to complete and enclose with their exhibits.

Architectural Assistant for Hong Kong.

Applications for the post of architectural assistant to Messrs. Little, Adams & Wood, of Hong Kong, announced in *The Builder* of August 25, are now being considered. Any further applications should be sent without delay to the Secretary, R.I.B.A., 9, Conduit-street, W., from whom full particulars can be obtained.

A Landmark to Disappear.

The unfinished church at Hassall, near Sandbach, is to be demolished. It has remained in an unfinished state for eighty years, being without windows or pews. As far as can be ascertained as to its history, building operations were commenced in 1836, but the church was never consecrated, and the name of the builder has never been discovered.

Edward VII Memorial.

It is announced that His Majesty the King will visit Edinburgh on Tuesday, October 10, to unveil the King Edward Memorial at Holyrood Palace. The scheme consists of the complete enclosure of the forecourt of the palace with gates and railings of wrought iron, supported by stone piers. There are three sets of gates—at the north and south ends of the forecourt and at the foot of Canongate—each consisting of a great central double gate, with two side gates. Between the Canongate and the north group a podium and screen of massive stonework has been formed as a setting for the bronze statue of King Edward. The latter, which is the work of Mr. H. S. Gamley, R.S.A., represents the King in his robes as a Knight of the Thistle, and stands 9 ft. in height, on a pedestal 7 ft. 6 in. The plans of the memorial were by Mr. G. Washington Browne, R.S.A.

Proposed Association of British Engineering Societies.

The Council of the Society of Engineers has arranged for a conference of the members of certain engineering societies to take place at the Engineers' Club, London, on Friday, September 29, 1922, at 3 p.m., for the purpose of considering and, if thought advisable, inaugurating the formation of the Association of British Engineering Societies. The Council feels that a number of local engineering societies at present working on more or less parallel lines but quite independently would derive mutual advantage from being brought into close touch with one another and thus assist to co-operate in various ways. It should be noted that there is no charge for admission to the Conference, but engineers who are members of recognised Societies should apply to the Secretary, Mr. A. S. E. Ackermann, for a badge.

Oriel Window, Bramhall Hall, Cheshire.

[This example of the half-timbered style is on the outskirts of Bramhall, near Stockport. The details are exceptionally good, as exemplified in this photograph of an oriel window in a corner of the front overlooking the terrace. There are several good half-timbered cottages in the village. Some sketches of the house were given in our last issue.]

COMPETITION NEWS.

Birkenhead War Memorial.

FOR THE BIRKENHEAD WAR MEMORIAL COMMITTEE.—Designs for a memorial at a cost not exceeding £4,000, to be erected on a site in Hamilton-square. Major Gilbert Fraser, F.R.I.B.A., has been appointed assessor. A premium of seventy-five guineas is offered to the author of the design which stands highest in the opinion of the assessor. Sending-in date, December 29. Conditions may be seen at the office of *The Builder*.

Cricket Pavilion.

FOR THE OLD CRANLEIGHAN SOCIETY, E.C.1.—Designs for a cricket pavilion. (See advertisement this week.)

New Garage at Clapton.

FOR THE METROPOLITAN BOROUGH OF HACKNEY.—Designs for a garage in reinforced concrete. (See advertisement this week.)

Other Competitions.

Other competitions still open include the following (the dates given are, first the sending-in date, and second the issue of *The Builder* in which full particulars were given): Antwerp Lay-out (Sept. 29, July 14); Colombo Town Hall (Nov. 1, July 14); Labour Saving Bungalow (Nov. 1, Aug. 7.); *Chicago Tribune* Building (Nov. 1, Sept. 15); Newcastle Baths and Public Hall (Sept. 15); Birkenhead War Memorial (Sept. 15)

CORRESPONDENCE.

Architectural Education.

SIR,—Your correspondent, "Fair Play," states that he is a strong supporter "of the articles system" because "it produces an intelligent architect, well versed in modern economic and commercial designing," which is apparently quite different from what he calls "artistic design"; such artistic design he reserves for "large and impressive buildings," "town halls," and "architectural edifices," whatever those are. His chief complaint against the school method of teaching is that it gives the student an unfair advantage over the articled pupil in that he becomes well versed in "artistic design," and consequently attains a facility in composition which puts the articled pupil at a disadvantage when competing in open examination. Facility in design is only possible when the author possesses an adequate vocabulary of ideas, based on a close study of ancient and modern work, and it is to be assumed that he who is "less rapid in design" lacks the necessary training and practice. This is a sure indication to an examiner of a student's capabilities and a by no means unfair method of examination.

As for your correspondent's complaint that the examinations of the Royal Institute set an impossible standard, the number of candidates who pass these examinations is a sufficient answer. While admitting the complexity of the subject I venture to say that the university student of architecture has to study far more subjects than the articled pupil, and also has to pass stiff examinations in every subject; yet he still finds plenty of time "for the minute study of doorways and pretty mouldings, &c., which our forefathers revelled in."

I dispute "Fair Play's" statement that "in the majority of cases a man between 20 and 25, brought up under articles, is by far a more clever and up-to-date all-round practical architect than is ever the case with a student of a university." The graduate of such a school as the Liverpool University School of Architecture is, at the end of the five years' training, as fully qualified in the structural engineering side of the subject as in design, in which I include plan, elevation, and section.

The programmes set in the schools cover far more subjects than it is possible to meet with in the average office and range from the most simple to the most complex, from the meanest to the most monumental schemes. The breadth of mind and imagination which can conceive great monumental schemes is a great asset which "Fair Play" may well envy. In this connection, his sarcastic reference to "majestic designs . . . with many thousands of steps . . . . descending to the water edge," is quite old and common amongst those who fail to appreciate any spiritual function in architecture and would understand better a diagram of Flemish and English bonding or a section through a manhole.

It is, perhaps, a pity that your correspondent's statement is not quite true that "when a large and impressive public building is proposed to be erected, in every case we have an open competition . . . . that no architect can force a design on the public." We would then be spared some of the atrocities committed in our streets. As regards clients not appreciating good design, I think it is a fact that the big commercial houses are realising, like the Americans have done for some time, that a beautiful building is a great commercial asset. Apparently, the proprietors of the *Chicago Tribune* believe this.

However, I read that "the country is crying out for practical architects who can design on modern lines," and that "the articled pupil is the man for whom the public are calling," and is "a man who is going to erect hundreds of buildings to suit the modern commercial world, and who is going to rebuild the world or part affected by the late war," so perhaps "Fair Play" cannot grumble as he is working under the right "system," and will, no doubt, be able to help to satisfy his country's crying need, rebuild the world, and make his fortune, while we university students will be content to fool about making "minute studies of doorways and pretty mouldings," not to mention sketching "thousands of steps leading to the water edge."

"FIAT LUX."

London Unique.

SIR,—Your reference to Devonshire House in your issue for September 8 recalls the discovery reported in your columns of the route for a new mid-metropolitan artery of surpassing importance, the opening to which would be on the site of the old-world residence in Piccadilly about to be demolished. The need for such is as apparent as in the case of Kingsway, because in the three quarters of a mile stretch between Piccadilly Circus and Hyde Park Corner the only openings northward are of a third or fourth rate character.

Since the suggestion was made I have been engaged in working out an amplification of the proposition which has resulted in the elaboration of a complete radial segment of the "London to be," through which the new artery would pass into the countryside as far as the 12-mile radial circle near Stanmore. In doing so, it would initiate a new feature in Metropolitan traffic improvement. In your columns of November 2, 1917, the following occurs:—"Were a belt of land reserved for cultivation thrown around each city in the kingdom, and kept permanently in that condition, there could be no more additions to the compact, congested areas known as cities, especially if it were also decreed that all unbuilt-on sites within the disc should remain as they are."

It is now proposed that the segment referred to should include a section of a metropolitan peripheral cultivated, but also *populated*, belt on a new principle. From the point mentioned above, its boundary would extend eastwards along the radial line for, say, six miles, or to a point midway between Elstree and Chipping Barnet. All the rural district southward would be included in the new belt as part of the segment. The latter would be designed to comprise the Metropolitan Boroughs of Marylebone, Paddington (possibly part of Hampstead); also Willesden, Hendon, Harrow, &c., or portions of them. Those amalgamated would form a unit in the economy of the new metropolis of the suggested provincial or municipal "State of London," also known as "Greatest London." All the railway connections in the district would be joined up, co-ordinated and added to, together with main roads requisite in the scheme of development, the principal being the new mid-metropolitan artery just referred to.

The objective would be the providing of housing accommodation for say a million, interspersed regularly and methodically throughout the vacant area, about 30 square miles in extent. The scheme would be designed so as to conserve to the utmost the area available for cultivation, and would follow the plan of tall isolated blocks, or groups of them, intimately connected-up and situated on a main road or line in the midst of vacant rural surroundings. The plan would be in opposition to the two-story-cottage "squat cities" of to-day with interminable mean streets, back-yards and fore-courts sprawling over and spoiling immense areas of land, and shutting out the population from even a glimpse of God's blessed countryside.

Communities of, say, 20,000 would be aimed at, whose circumscribed centre of location would not cover more than, say, a fourth of the area available—the density per square being a matter for consideration. Each centre would be replete with every modern convenience and connected up in the most practical way with other units and the metropolis in general. They would be planted with due respect to the configuration of the district, the amenity of the landscape and the preservation of the existing rural and other features as far as practicable.

Each community would have its farmyard centre, or would share one with other communities, and all the intervening spaces would be devoted to cultivation or for recreation. In such a way provision would be made for the clearing of unhygienic central areas, as also the restriction of the entirely-built-over discs of cities, in a manner which it is believed would prove satisfactory. Returning to the central part, the new main artery would, in keeping with the general plan of "London Unique," be on an underground or "just underneath the surface" plan with underground facilities for traffic of all kinds, and the other services.

The street proper would be an arcaded structure of great height raised above the lines of traffic, flanked with carriage and pedestrian ways. Passages to the arcaded central portion would be provided in the shop front arrangement. A strip of area, sufficiently wide for the new formation, would be scheduled. Starting from the Mall, adjoining the "Regal Circle," the new roadway would pass under Piccadilly to Berkeley-square, and under Oxford-street with the objective of Marylebone Parish Church via Manchester-square. St. John's Wood would be reached by means of a mall and sunken road from the Inner Circle. Thence the course would be diagonal to Maida Vale at Sutherland-avenue "points," known as "the Warrington."

There, at the confluence of various roads, a considerable radius of vacant space exists, which might conveniently be largely added to and designed as the principal centre—municipal, social and traffic—of a division of the new metropolis, just described. It would be premature to say more, but much might be made of it in conjunction with other traffic improvements already outlined in your columns, so that a complete connected-up whole might be the result achieved.

It is urged that the arrangement as a whole is the only practical means whereby the Metropolitan Boroughs can have the opportunity of expanding and of relieving satisfactorily the pressure of population, now felt so intensely in relation to the housing question, and it is opportune when the whole question of traffic improvement calls for solution. Recently a similar arrangement in another section was described in your columns under "Higher Buildings and Our Squat Cities." "O. B. I. T."

The Master Builder on the Sands.

(See letter on this page.)

Sand Architecture.

SIR,—I enclose a photograph taken on the sands at Frinton. It does not pretend to be a contribution to architecture, but it might be of interest as showing what is possible with ordinary seaside sand in the way of constructing models of buildings for the education of children. You will quite appreciate the technical difficulties of forming a building with upright sides and a dome in such a difficult material as sand. Most efforts at sand building are confined to glorified hills or modelling in rather low relief. This is because the technique of handling sand is not understood. The building illustrated was constructed by making a firm hill of sand and then cutting out of the solid, as one might cut a piece of cheese. I do not think you will often find an erection of this description. The sand was not reinforced in any way. It was erected by the boys in the photograph and myself.

CHAS. W. CROPPER.

Ilford.

THE COMPLEAT ARCHITECT.

By DUDLEY HARBRON.

I.—APTITUDE.

Writers on education recognise that the apt student is at an advantage over his fellows. This is especially true of the arts—poets are born, not made. The sculptor, liberating the angel from its marble encumbrance, was a sculptor by instinct, not instruction.

John Locke, in his treatise "On Education," writes of this aspect of the question of aptitude. In reference to drawing as part of a general education, he says that it is desirable in every pupil that he should be able to sketch, especially if he has a genius for it, and continues, "but where that is wanting, unless it be in things absolutely necessary it is better to let him pass them by quietly than to vex him about them to no purpose"—as if it were impossible to teach the inartistic art. Ruskin says, somewhere in his writings: "It is no man's business whether he has genius or not; work he must, whatever he is, but quietly and steadily, and the natural and unforced results of such work will always be the thing that God meant him to be, and will be his best." Although Locke and Ruskin state the problem in such different ways, they are in agreement in their conclusion. It is the fashion of supercilious persons to slight their views, yet all experience proves that, in this case at least, they are justified.

For there are a fortunate few, even in the complicated profession of architecture, who have fulfilled the programme indicated by Ruskin, that is, who having been educated continue leisurely with their own education, arrive at maturity, and discover, when perhaps they least expected such an outcome as a result of their studies, that the course of their development, and their own inclination, had led them to the threshold of an architectural career. Not unexpectedly such recruits have proved to be among the most able members of the craft. In the same sense we have the case of Greuze, who, intended by his father for an architect, and by that stern parent forbidden to draw in freehand lest he should become an artist, nevertheless privately followed his natural bent and took to painting, with what success we know. In similar vein does the young man of Mr. Belloc's, intended by his father for a merchant, tell the truth to his mercantile employer, receive his quietus, and become an engineer.

Without multiplying instances, have we not here an indication that there is something other than training, however complete, that is requisite to success in any vocation? Yet, for most youths, the irrevocable decision is made much more abruptly, and the simile of the pitchfork is more convenient than that of the plough.

It is obvious that the choice of a career is a matter requiring the most careful consideration. It is still a problem with which parents and teachers are called upon to grapple, sometimes with very little assistance from the child whose well-being is their chief consideration. The most careful system of examination yet devised (in spite of psychological progress) has not succeeded in indicating with any degree of certainty in what sphere of life a youth is likely best to employ his dormant faculties. Teacher or parent, with the best will in the world, cannot be acquainted with the requirements or difficulties besetting each different vocation; so that, perhaps, to some chance phrase or passing whim is due the selection of a career. The very attribute, facility for freehand drawing, which the father of Greuze was so anxious to suppress, is considered by most parents a sufficient warrant for an architectural upbringing.

The public knowledge of a shortage of houses, of a kind that pre-war architects had very little to do with, is very largely responsible for the great influx of students into the profession. With what success aspirants thus imbued will meet remains to be demonstrated; alone they are inadequate, for architecture as an art demands that one gives more than one receives. If these young men are willing and capable of thus effacing themselves, then there is hope for them, and the future.

Granted that aptitude is desirable, is there any faculty evident at an early age (apart from the five senses, of which two only are æsthetic, according to Comte) that is an absolute requisite for the architect in embryo? Or, is it possible to take any raw material of average intelligence, and by a diligent course of directed study to assure that he or she will turn out capable? It would seem that the R.I.B.A. Board of Architectural Education held some such opinion—unless it is considered that a programme designed to educate is, on the other hand, calculated to exterminate. I wish I could think that either of these propositions were true.

Vitruvius told the Emperor Augustus that an architect should be versed in geometry, mathematics, hygiene, astronomy, music and letters, but then he, poor fellow, could not foresee the modern extension of his syllabus. We have had definitions in plenty since then. A recent writer, M. A. Vaillant, in his book, "Theorie de l'Architecture," writes that architecture should satisfy the demands of intention, fitness, permanency, wholesomeness, cost and truth; and inferentially architects are charged to realise these qualities in building.

The first of these attributes—intention, or destination—is that essential preliminary for the practitioner called "taking clients' instructions," and for the student the assimilation of a project or scheme given in words or writing by his instructor form the basis from which every edifice must originate. Unless, in its simple form, a youth is able to grasp the "intention," he will be entirely unable to satisfy any of the subsequent demands enumerated, and had far better concentrate his attention upon growing potatoes.

It is an architect's business to interpret. To do this he must be receptive, in order to form a content from the depths of which emerge the form in which the intention takes material shape. Apart from reason, it is not possible to cultivate a sense of form, yet we often meet with the contention that form is a matter of "taste," and that taste cannot be defined; that its canons, even with respect to deportment, constantly vary within the same strata of society.

The youth who can envisage any common object sufficiently clearly, and at the same time have a command over the pencil equal to the delineation in two dimensions of the object so visualised on paper, starts with an advantage over his fellows who are incapable of passing such a test. For designing in two dimensions that which in reality has three, requires this faculty to be developed to a considerable degree. The possession of a systematic, logical mind, a capacity for the arrangement of matter in order of importance, of subordinating detail to the whole, grasping and developing salient features—the gift of these qualities or the glimpse of their likely development are much more useful traits than the common fiction of proficiency with the pencil, although drawing with a line of some character is a power to be desired.

A consciousness of the progressive development of history (stated by some writers to be of recent growth), a turn of imagination equal to vivifying the dull records of the past, betoken the type of mind that will evolve rather than copy.

There are many attributes which at maturity it is as essential to find as an aptitude for design; indeed, they all contribute to such ability, but their possession cannot be looked for or expected in a youth who is entering the profession. Their presence would mitigate against his success, which does not, at this stage, lie in the ability to estimate the probable cost of excavating the moat so much as the power to grasp the possibilities of a castle in Spain, which power of vision the pressure of civilisation has tended to make more and more remote from the usual capacity of conception of the adolescent. Is it too much to demand that the aspirant should possess some of these qualities?

THE ARCHITECTURAL ASSOCIATION.

A LANTERN lecture on drawings by William Walcot, A.R.E., F.R.I.B.A., of the great temples of antiquity and Roman compositions, was given by Miss Atkins at 34, Bedford-square, W.C., on Thursday last week.

Miss Atkins explained that the first ten slides were from the famous series of etchings known as the Roman compositions, the main part of which were reconstructions based on actual ruins of monuments, the others being creations of the artist's fertile mind. It would, she continued, help her very much in her lecture if they would try to put away from their minds the modern spirit of commercialism and science, their present forms of living, both religious and civil, and let Mr. Walcot lead them right into the heart and spirit of the wonderful days of ancient Rome, Greece and Babylon. That was the real beauty of Mr. Walcot's work. It was not only architectural and archæological, but an artistic impression of all these blended with a wonderful insight into the past; in fact, she almost believed what many others had said, that Mr. Walcot must be a kind of reincarnation of an ancient Roman. A critic once said that Mr. Walcot worked with a magic brush, but it was also a very human one, as he brought them so directly in touch with the people themselves and their various modes of life.

The lecturer dealt with the following subjects: The Colosseum, or amphitheatre of Flavian; a Roman Court of Justice; the Propylæa, Athens; House of a Patrician; A Tragedy of Sophocles; Babylon; The Forum; the Frijdarium or Cold Baths of the Caracalla; The Caldarium or Hot Baths; The Atrium of a House of a Patrician; the Temples; the Archaic Wooden Temple of Apollo, Thermos; the Etruscan Temple of Jupiter Capitolinus; The Temple of Luxor; the Seventh and Last Wooden Archaic Temple of Diana, Ephesus; the Hecatompedon; Temple G. at Selimunte; Temple of the Sun, Baalbec; Antony Visiting Cleopatra and the Morning of the Festival; the Stadium of Domitian on the Palatine Hill, Rome; and the Trojan Horse.

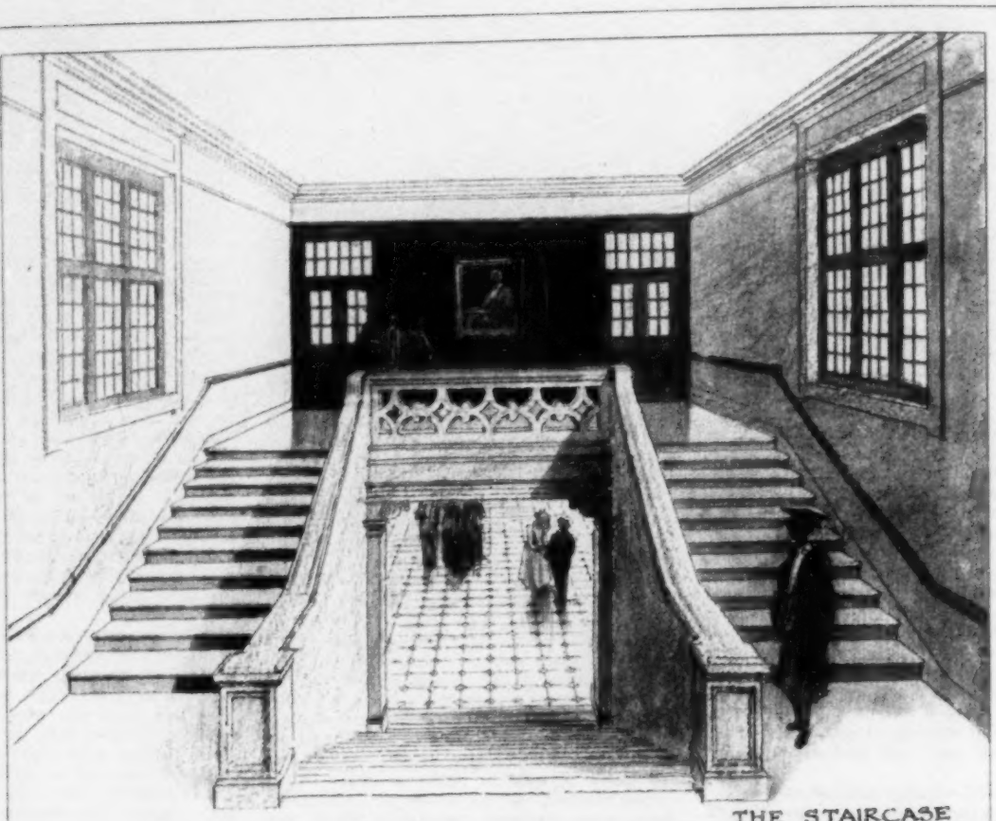
Miss Atkins' descriptions of the illustrations showed considerable research and much enhanced the interest of the lecture.

Rebuilding an Old Sussex Bridge.

The reconstruction of the Norfolk suspension-bridge, which carries the main Brighton-Worthing-road over the Adur where it enters Shoreham Harbour, is to be undertaken. The new structure will be different in style, and of sufficient strength to carry loads in excess of those now permitted by law. The Ministry of Transport has promised a grant towards the cost of the work.

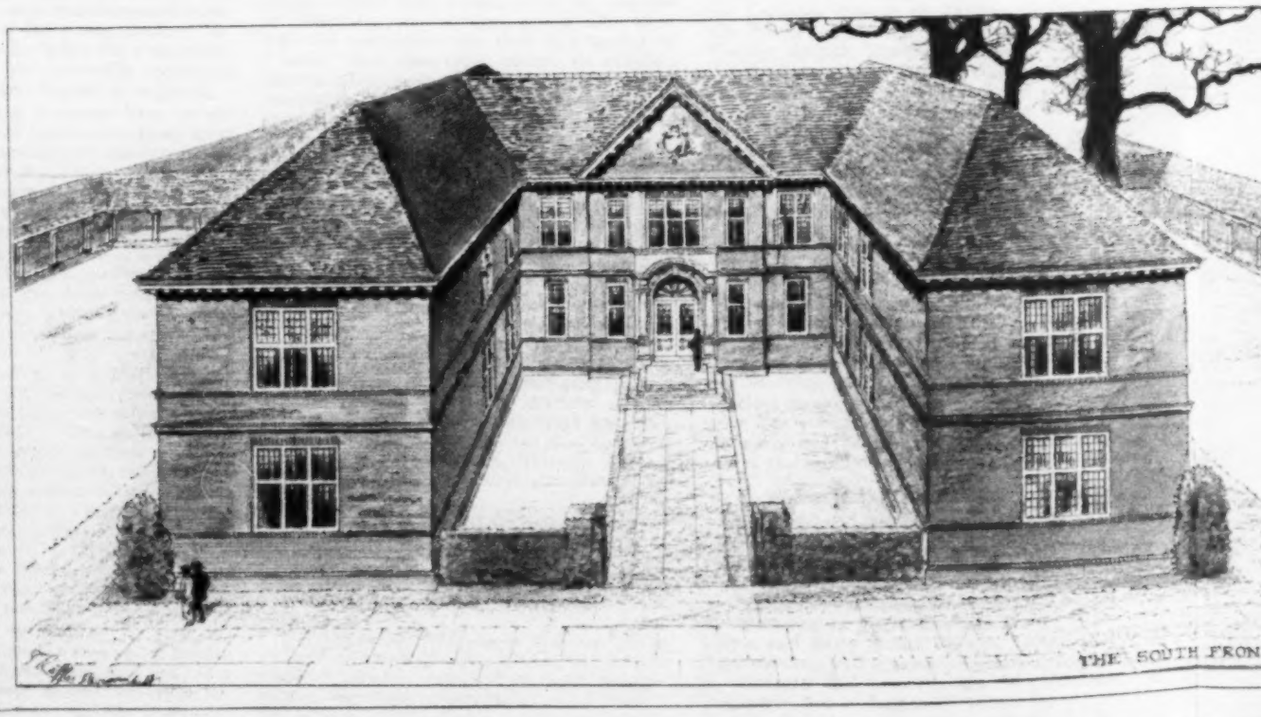
Decoration and Furniture.

Messrs. B T. Batsford announce in their Library of Decorative Art, "Decoration and Furniture in England of the later Eighteenth Century," by M. Jourdain. It will be followed by a volume by the same author on "Decoration and Furniture in England of the Tudor, Elizabethan and Early Stuart Periods, 1500–1660." From the same publishers comes a series designed to illustrate the achievements of "Modern Decorative Art in England," edited by W. G. Paulson Townsend. Marjorie and C. H. B. Quennell are also issuing this autumn the second volume on early man in their Everyday Life Series, devoted to "Everyday Life in the New Stone, Bronze and Early Iron Ages."



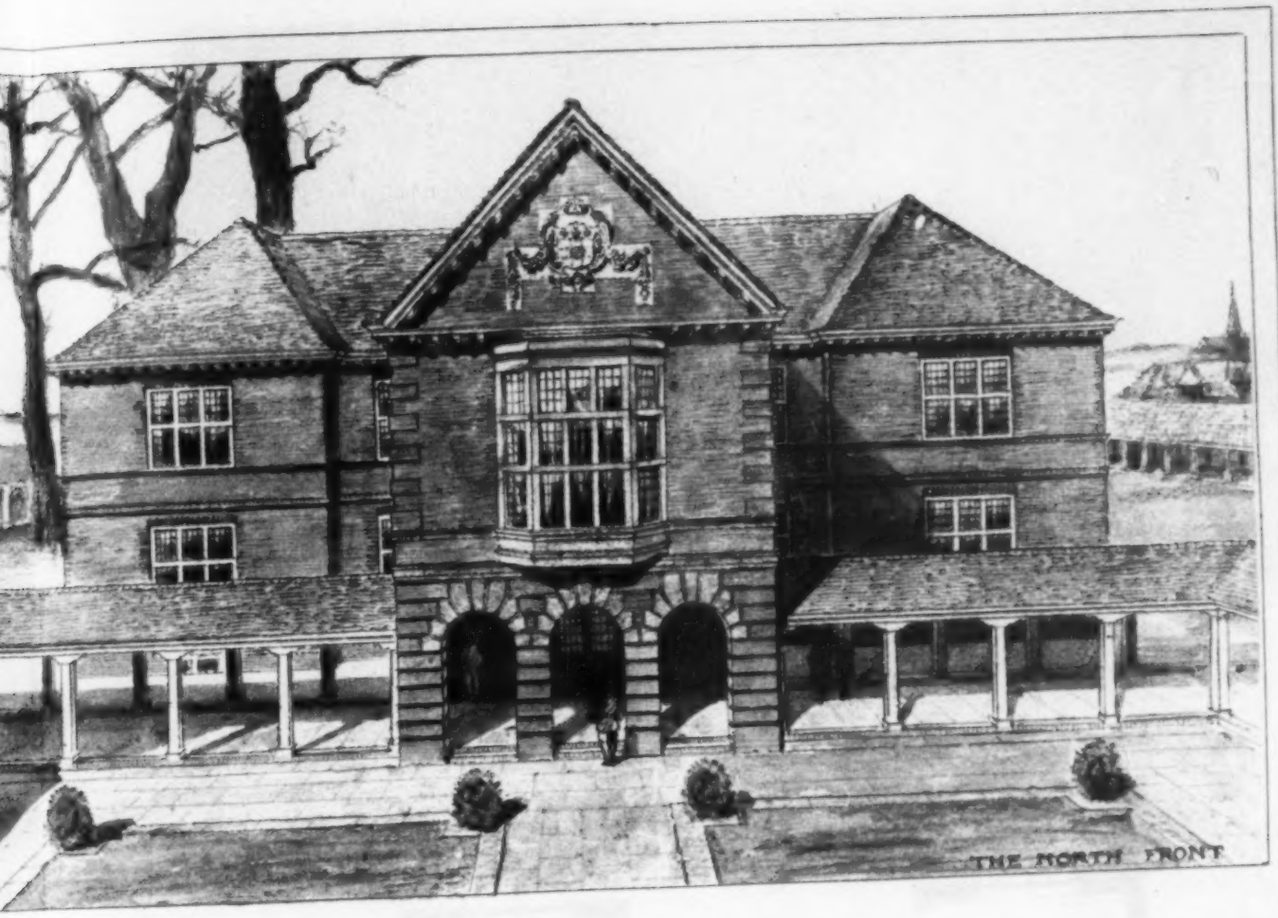
THE STAIRCASE

THE LIBRARY UNIVERSITY COLLEGE READING



THE SOUTH FRON

MESSRS. CHARLES SMITH, F.R



THE NORTH FRONT

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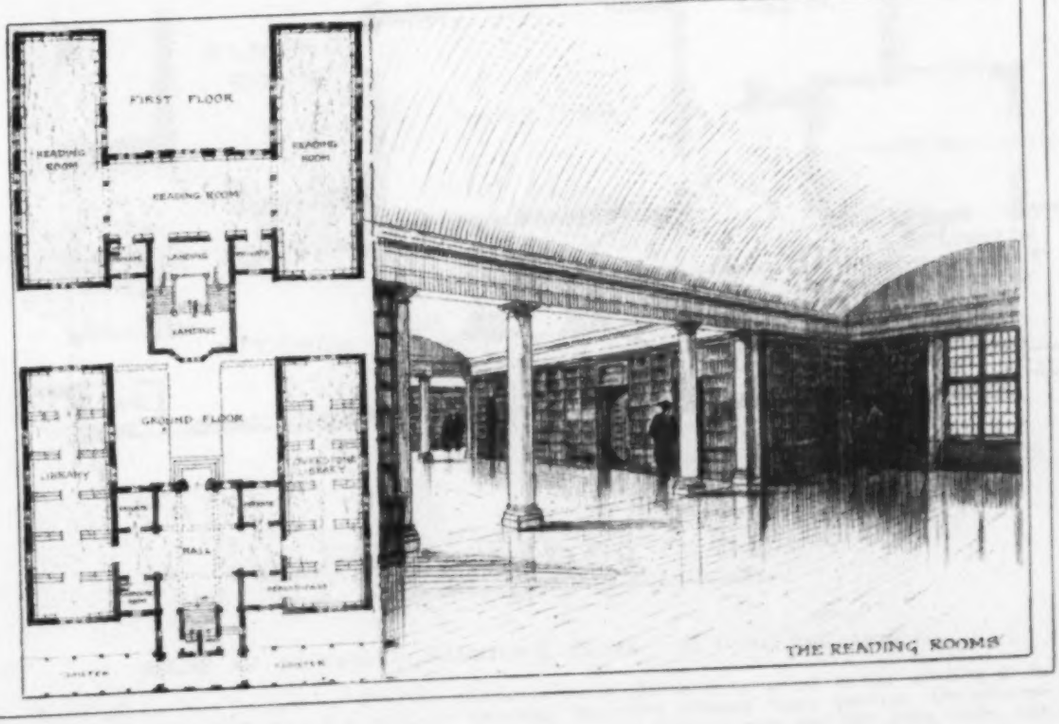
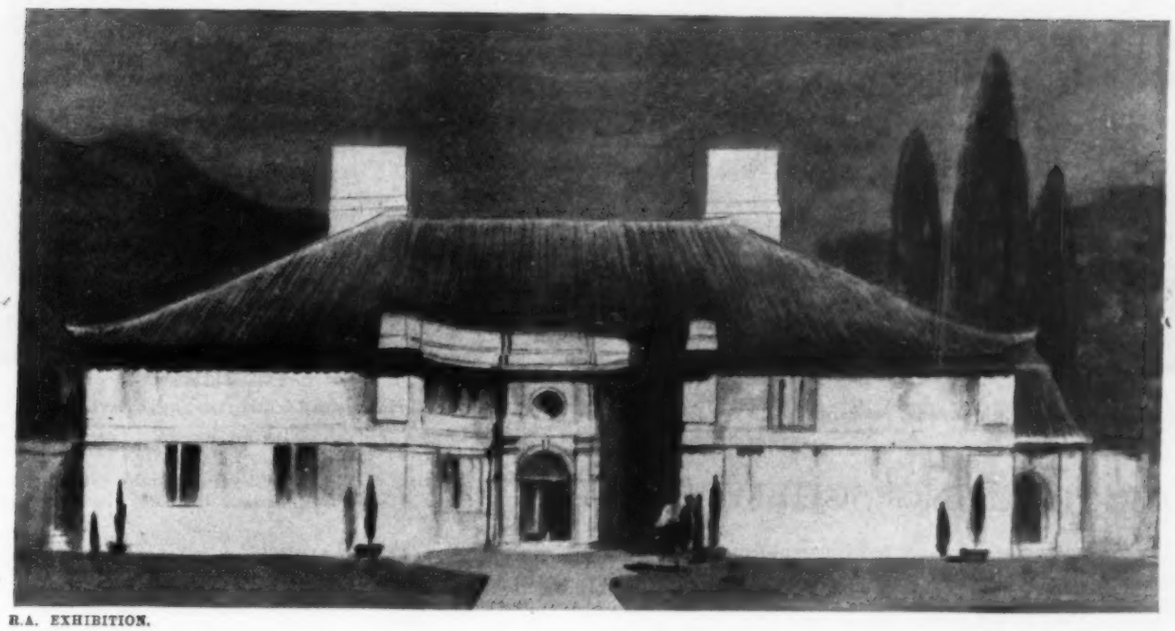


THE READING ROOMS

RLES SMITH, F.R.I.B.A., & SON, ARCHITECTS.



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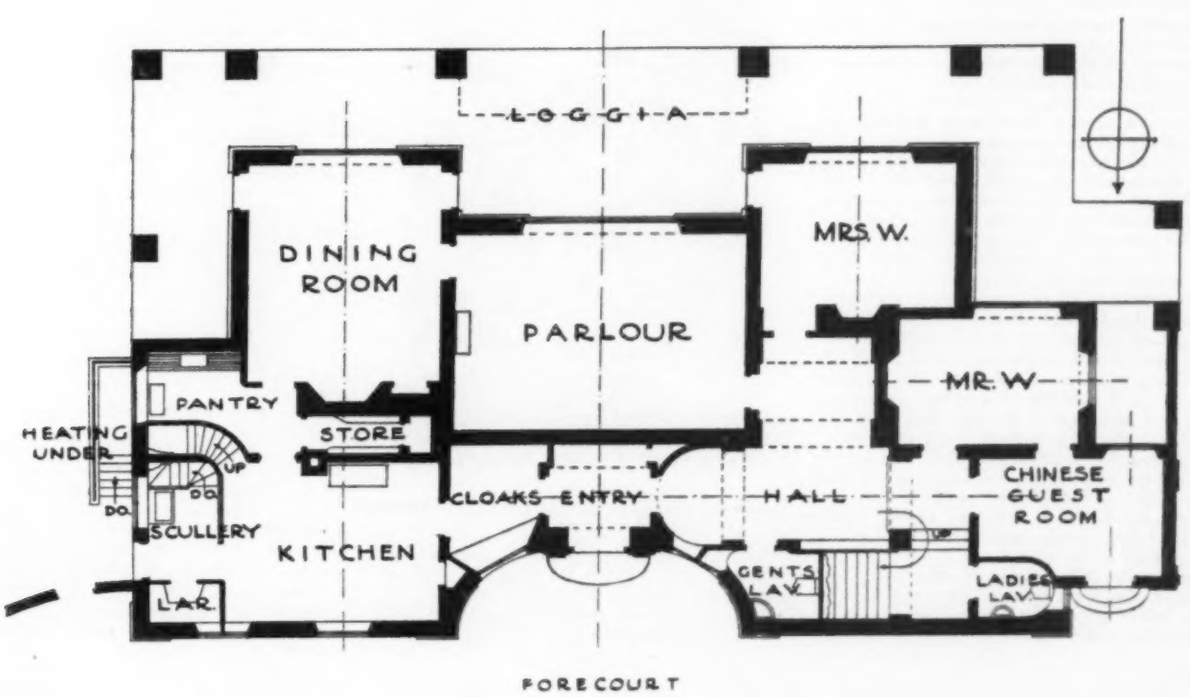
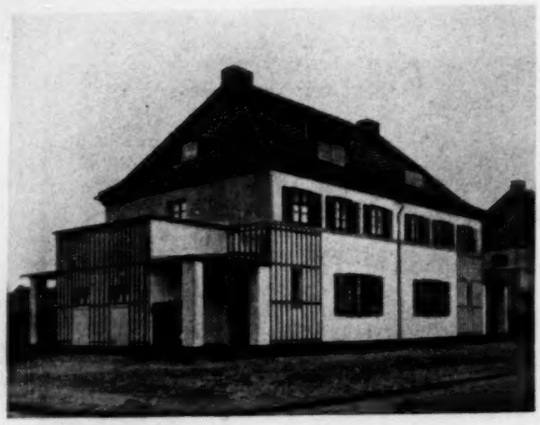


GROUND FLOOR PLAN

SCALE OF 0 10 20 FEET

HOUSE AT TSI-NAN-FU, SHANTUNG, CHINA. MR. OLIVER HILL, Architect.

[This house has been designed for European occupation for a site in a compound on the outskirts of the town. It is approached through a gatehouse containing the native servants' living quarters. The entrance elevation is on the north side. Points to be considered in the planning were that the living rooms and bedrooms should all have a southern aspect and be protected from the direct rays of the sun. A loggia has, therefore, been arranged around these rooms on both floors, on the south, east and west sides. The windows to the ground floor rooms are arched and of large areas of glass to afford unbroken views of a distant range of mountains.



Pair of Houses at Lichtenrade, near Berlin. Type 1919.

Pair of Houses at Lichtenrade, near Berlin. Type 1920.

HANS JESSEN, Architect.

SOME HOUSING SCHEMES IN GERMANY.

Berchtesgaden.

A FEW miles over the boundary from Salzburg is Berchtesgaden, which, beautifully situated in the Bavarian Alps, is a favourite centre for numerous excursions. Indeed, with characteristic thoroughness, the inhabitants have catalogued no fewer than 200 of these, which are to be found hanging, in tabulated form, in the halls of most of the hotels. At Berchtesgaden a small housing scheme has been carried out, consisting of a block of nine houses. Contrary to the usual Continental arrangement the divisions are vertical instead of horizontal. The building is thus divided into nine houses, separated by party walls, instead of into flats.

The accommodation comprises a kitchen, a scullery, a w.c., and four rooms. Each house is completely cellared, an expensive arrangement that is now apparently considered quite essential. The houses are supplied with water and electric light, but no gas, of which there is, indeed, no public service in the town. The walls are of solid concrete as far as the ground floor, which is also of concrete reinforced with R.S.J. The walls of the lower story are of solid brickwork; those of the top floor are of timber, the space between the weather boarding and internal lining being pugged with a kind of compressed peat. The division walls are of studding filled with brick nogging. Each house has a large balcony. The windows throughout are double, one set of casements being set flush with the outside of the wall and one with the inside. This is a precaution against the cold that is usually met with in better class houses in this district, but is not always found in the poor houses. Its adoption here, at a time when building costs are enormous, is indicative of the good quality of the work.

The walls are plastered externally and whitened, and the roof is zinc covered. The site is an extremely difficult one, having a frontage to two roads which have an acute angle junction; there is, moreover, a considerable fall which necessitates stepping at every party wall. The work has been undertaken by a society which receives State-aid and is approximately equivalent to our P.U.S.

Houses at Berchtesgaden under construction.

The present wages of a bricklayer and carpenter on this scheme are about 5 marks an hour, which before the war represented 5s., and which at the moment of writing (June 1922) is worth 1d. The earnings in Germany are, therefore, slightly less than those in Austria, but there is a constant fluctuation in these values.

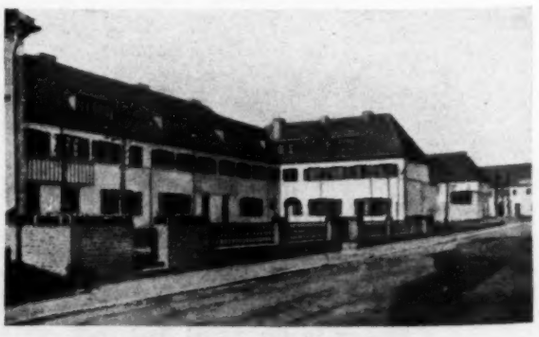
Lichtenrade.

At Lichtenrade, near Berlin, there has been considerable building activity. Although in Germany this scheme is described as a settlement, the development more nearly approaches to our garden suburb. There is a variety of houses, detached, semi-detached, and in terraces. One group of detached houses is constructed entirely of timber on a brick foundation rising about 12 in. above the ground. The walls of the main building below the eaves are covered with weather boarding, but the gable ends, lean-to, and dormer cheeks are covered boards butt-jointed vertically, the joints being covered with a narrow fillet painted white, which contrasts pleasantly with the dark tones of the wood preservative with which the rest of the timber is covered.

A favourite roof form in Germany, as, indeed, throughout the Continent, is the Mansard truss, and an illustration of a detached house with this type of roof is given. The walls are solid to the eaves, above which the whole construction is of wood. This type of house is one that is frequently built in concrete. Indeed, although not on this scheme, concrete small houses and cottages are more frequently met with than in England, and their design is, for the most part, superior to the dull type of concrete box sometimes to be seen in this country.

The accommodation in the different types of houses varies considerably. The plans of a pair of houses known as the 1919 type are shown. They contain a living room, kitchen and scullery on the ground floor, and a combined bath and w.c., two bedrooms, and a large store cupboard on the first floor. There is also storage accommodation on the ground floor in those houses which are not cellared, and a large bedroom is provided in the roof. The outside shutter is a feature which helps the architect, and its presence here redeems a design which might

Shopping Centre, Lichtenrade, near Berlin.



Group of Houses at Lichtenrade, near Berlin.

House at Lichtenrade, near Berlin.

House at Lichtenrade, near Berlin

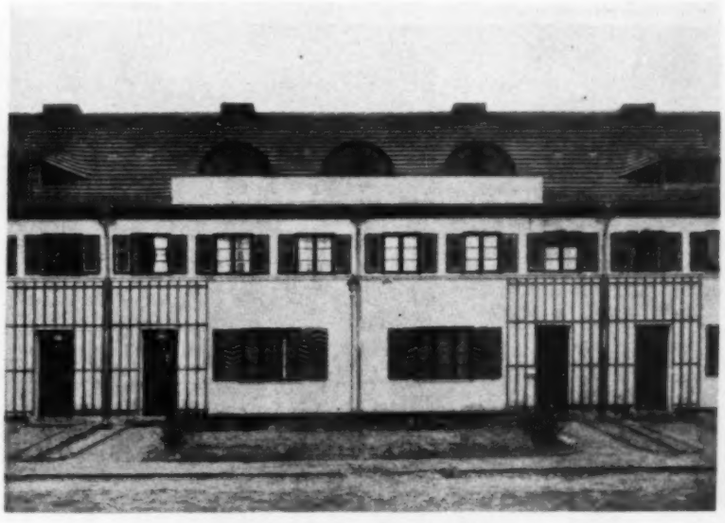
HANS JESSEN, Architect.

otherwise be dull. The closely spaced shuttered windows above the stringcourse have the effect of a frieze. In another smaller type, a plan of which is reproduced, there is a dining room, a living room, combined kitchen-scullery, and two bedrooms. Here the presence of a cellar necessitates raising the ground floor, and the entrance is on to a half landing between the basement and first floor. This arrangement produces an unsatisfactory design which has the appearance of being under fenestrated.

Some interesting grouping is shown at the shopping centre. The shops themselves are set back under an arcade, which forms a balcony for the flats above. Opposite the shops there is a group of houses arranged round a courtyard. The least satisfactory part of the composition is the terrace of houses which faces down the street of shops. The semi-circular windows in the roof—looking like the end of Olympia or one of the newer Covent Garden markets—are unpleasant.

It will be seen, however, from these illustrations that considerable care has been expended upon the detail, and the whole, although not so startling as the new Dutch work, is typical of the small modern German architecture, which, having purged itself of the meretricious *nouveau art*, is becoming one of the most vital architectural influences in Europe.

The architect for this scheme is Hans Jessen, who has carried out much work in North Germany, including a school in Lichtenrade and large offices for the Deutsche Bank in Darmstadt.



Type 1919 Houses at Lichtenrade, near Berlin.

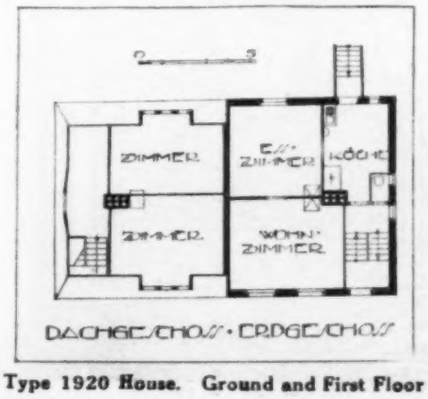
HANS JESSEN, Architect.

A Central Home of Freemasonry.

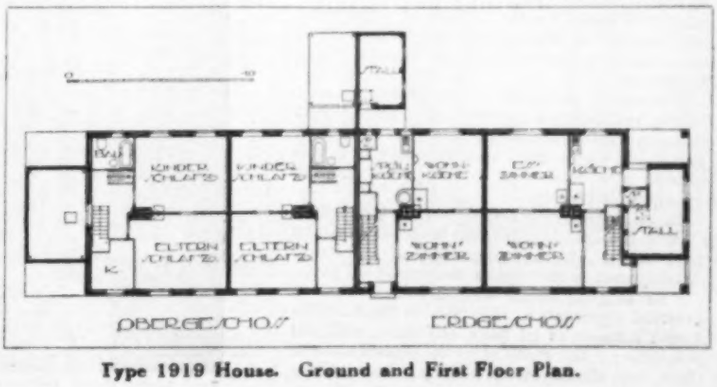
The United Grand Lodge of England has left to its December meeting the decision as to the site for a Central Home of Masonry, which is to be the memorial to the members of the craft who lost their lives in the war. It is stated that the choice appears to be between the retention of the present site in Great Queen-street, as extended by the additional property adjoining, which has been acquired in the last three years, and an alternative site in Adelphi, which would involve an expenditure of from £300,000 to £350,000 more than rebuilding in Great Queen-street.

Victoria and Albert Museum.

During the recent restoration of the Gate of Honour of Gonville and Caius College, Cambridge, plaster casts were made of some of the more interesting details, and a set of these casts, twelve in number, have been presented to the Victoria and Albert Museum by the Master and Fellows of the College. This gate, one of the most pleasing works of the early Renaissance in England, was erected in 1574, traditionally by an architect named Theodore Haveus, a native of Cleves, but more probably by Dr. Caius himself, who refounded the College, and was responsible for the Court on to which the Gate of Honour opens. The casts have been placed on exhibition in the Central Court of the Museum.



Type 1920 House. Ground and First Floor Plan.



Type 1919 House. Ground and First Floor Plan.

GOTHIC ARCHITECTURE IN ENGLAND.*

THE beautiful art of our English mediæval builders is a constant subject of delight to students of architecture; whether they approach it from the artistic, the historical, the ecclesiastical or constructional aspects, the field of research is immense.

Mr. Samuel Gardner has not attempted to deal exhaustively with all aspects of English Gothic in his interesting guide, but has placed before his readers in 180 plates a record of the appearance of typical examples of English building and its ornamental detail from Saxon times to the Perpendicular period. Each plate is accompanied by a footnote of explanatory text, and each example is dated and labelled with its appropriate period.

An alphabetical glossary of technical terms is given in the beginning of the book, and is illustrated with very able pen-and-ink sketches, which have lost nothing in style through being made clear and explanatory of the facts.

One of these diagrams showing a section through the Angel Choir at Lincoln is unfortunately marked with a large P, used elsewhere throughout the book to signify Perpendicular style; it refers, however, to the name of the artist (Mr. E. Godfrey Page, A.R.I.B.A.). In this drawing the triforium galleries are shown as if the vaulting had been filled up to crown level, though a photograph on Plate XCIX shows that the upper surface of the aisle vault at Lincoln is really curved with planks placed across for access. Lightness of structure is one of the characteristics of Lincoln Cathedral, and the infilling, not unusual elsewhere, seems to have been left out in accordance with the builders' feeling for economy of weight throughout the design. The slender piers of the Angel Choir are not such as would stand much additional and eccentric loading.

One page of text only is allotted to the subject of vaulting, concerning which the author remarks:—"Gothic architecture has been represented by some exponents as synonymous with vaulted construction. The great churches of the Ile de France, in which the framework consists of a lofty vault poised on a scaffolding of flying buttresses, are regarded by them as the sole logical development of the style entitled to the name Gothic.

"In England, however, the style we ordinarily term Gothic is manifested in many other ways:—

"In colonnades, sculpture and constructive methods, not always adapted for vaulting.

"Vaulting, though usual and very important, is not an essential of English Gothic."

The use of the vault in English and French work is not by any means identical, but the idea of vaulting seems never to have been far from the mind of the Gothic constructor. Buildings purposely designed for ceilings as distinct from vaults generally demonstrate this fact in many of their details, and the carved imitations of vaults in the heads of niches or the traceried canopies of stalls show the delight of the carver in these noble constructional forms.

English Gothic differs from French in certain points of vault management, but the Englishman was interested just as keenly as the Frenchman in the restraint of vault thrusts, and at last, in King's College Chapel, c. 1480, demonstrated his mastery of the statical problems without unnecessary parade of multiple tiers of flying buttresses.

Tracery is discussed at somewhat greater length, and Ruskin's appreciation of tracery that concentrates attention upon the masses of light and shade rather than upon intricacy of line is quoted with references to the plates showing examples of tracery.

In an appendix on the plan of the Gothic Church the author rightly gives emphasis to the part taken by the necessities of structural development in the triple arrangement of parts.

"In length, width and elevation, also in external appearance, the plan is triple. The length consists of (i) nave, (ii) choir, and (iii) presbytery; the width of (i) the central nave or choir, and the (ii) north and (iii) south aisles; the elevation of (i) the main arcade, (ii) triforium, and (iii) clerestory; while the central and two western towers stand up, giving a conspicuous threefold appearance, especially from a distance.

"This triplicity is often regarded as symbolical. . . . In fact, it is ultimately due to the three dimensions of space. For instance, the three towers are emphasised buttresses to resist the thrusts of the arcades, and the aisles are the readiest way of increasing width."

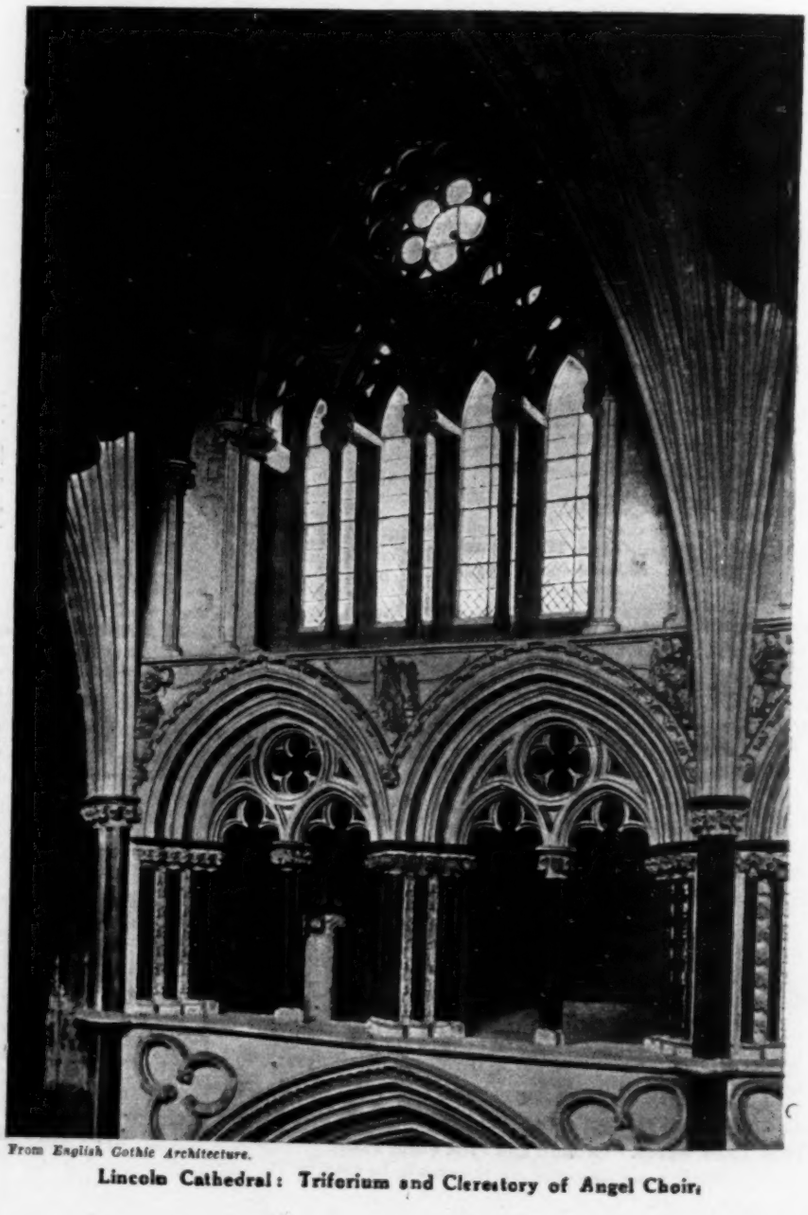
Another appendix on "Bishops, Architects, and Freemasons" points out that the names of Bishops associated with certain great works need not be taken as evidence that the design was actually elaborated by them.

Other days doubtless had other methods, but it would be dangerous to suppose that beautiful and stable works of architecture were achieved without the employment of drafts and models of a very complete description.

"The fact is that when architecture was a living art, buildings grew rather than were designed." Possibly it would be truer to state that the knowledge of architectural design was shared by a greater number of the parties proposing to build than generally happens at the present time. The client seems to have brought to the work at least enough understanding to be an interested critic if not a director in the undertaking. "The bishop must have consulted cunning workmen and have arranged a rough plan of operations, but the details were left to the workmen themselves, and were designed and executed when the occasion arose, no doubt under the eye of a foreman or master." This method still survives in some parts of the East, but it is doubtful whether the sentence conveys to the untravelled reader the enormous amount of work that is built up and taken down by this process of trial and error. The results are charming to anyone not a devotee of mechanical accuracy, but the time spent would pay an architect's fees several times over if it had to be reckoned up at union rates. Not only does the client "consult his cunning workmen," but he has to visit the site during the whole progress of the work and guide the "growth" of the "living architecture" by a process of discussion, argument, and the examination and rejection of preliminary models and arrangements of lines marked out full size upon the site. Actually the cost of designing living architecture in this way is very high, but the work reflects the care expended upon it by the client and "grows," not because it is less designed than ours, but because design is applied to every detail upon the site where the factors of the problem are in process of being assembled.

The many beautiful photographs and the appropriate information given at the foot of each make of the book a most valuable work of reference in all that pertains to the visible appearance of English Gothic architecture.

*_A Guide to English Gothic Architecture._ By SAMUEL GARDNER. Cambridge: At the University Press. Price 16s. net.



From *English Gothic Architecture.*

Lincoln Cathedral: Triforium and Clerestory of Angel Choir.

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ILLUSTRATIONS.

The Church of the Good Shepherd, Brighton.

This church, of which only a portion, consisting of four bays of the nave and the western porches of approach, has as yet been built, is a frankly "post-war" structure in which quiet restraint and economy of means and materials have been the accepted conditions. The nave, which is 87 ft. long by 34 ft. wide, consists of five very plainly arcaded bays, and is flanked by narrow passage aisles, which are lit by windows, alternately of three and of five lights, the nave receiving its main lighting from a large west window of five wide and tall lights. Beneath the centre of this window is the font. The church is entered by northern and southern porch doorways in its westernmost bay, the southern porch being large and roomy, the northern a mere weather shelter.

The chancel, which is 30 ft. long by 32 ft. wide, is flanked at the entrance from the nave by two "tribunes" or fixed pulpits, with passage running eastward from these behind the backs of the triple ranges of choir stalls, to the communicants' step and the sanctuary.

There being a rapid fall eastward in the ground upon which the chancel is to stand, large choir and clergy vestries, as well as a heating chamber, are placed beneath the chancel, to gain full height, in which there are nine steps in all from nave to sanctuary. On the south side of the chancel is a large square tower "astride" of a morning chapel, the sanctuary of the latter being prolonged under a low roof eastward; the chapel is about 3 ft. below the nave level, and is approached from the nave by a flight of steps, and from the ground outside through a porch. The upper portion of the tower is intended to contain the organ chamber, with a ringing loft and belfry for a peal of bells above.

The general construction is as follows:—The external walls consist of a stout inner wall of concrete separated by a cavity from an external "skin" wall of brick, and tied to the latter with brick bonding ties. The internal arcade walls, piers, and arches are in concrete. The whole of the window framing, mullions, cills, and heads, is in fine cast concrete, almost the only stone employed being for the gable terminals and crosses, the nave coping, and a niche, intended for a future statue, in the west gable.

The arcade walls are low and the wide roof, covered externally with hand-made red tiles, ceiled inwardly in "barrel roof" fashion, and subdivided by moulded ribs, which, together with the deep moulded cornice at the connection with the walls, are lightly painted in decorative patterns. Upon the cornice, and punctuating the divisions of the ceiling and the arcade bays, are large shields bearing gilded emblems of the Passion, varied by the sacred monogram.

The east end is temporarily walled in and covered externally by means of the unsightly but useful expedient of galvanised iron sheeting. Two temporary vestries have been formed by enclosing the easternmost bays of the aisles, and a temporary floor of wood, with a wide altar dais, provides for the immediate needs of the sanctuary. The church and its site are the gift of Mrs. Moor, in memory of her late husband, Canon Gerald Moor.

The architect is Mr. Edward Warren, F.S.A., F.R.I.B.A., and the work has been carried out by Messrs. Packham, Sons, & Palmer, of Preston Park, Brighton.

Space has been reserved on the southern side of the church for a vicarage which it is intended to put in hand shortly.

New Library, University College, Reading.

We publish this week illustrations of the new library at University College, Reading. This building is now in course of erection, and is the most recent addition to this Institution. The builders are Messrs. Collier & Catley and the architects, Messrs. Chas. Smith & Son, both of Reading.

Amongst the sub-contractors are Messrs. G. N. Haden & Sons, heating engineers; Messrs. Dawnay & Sons, constructional steelwork; and the Kleine Flooring Co.

Quarry Cottages, Oxted.

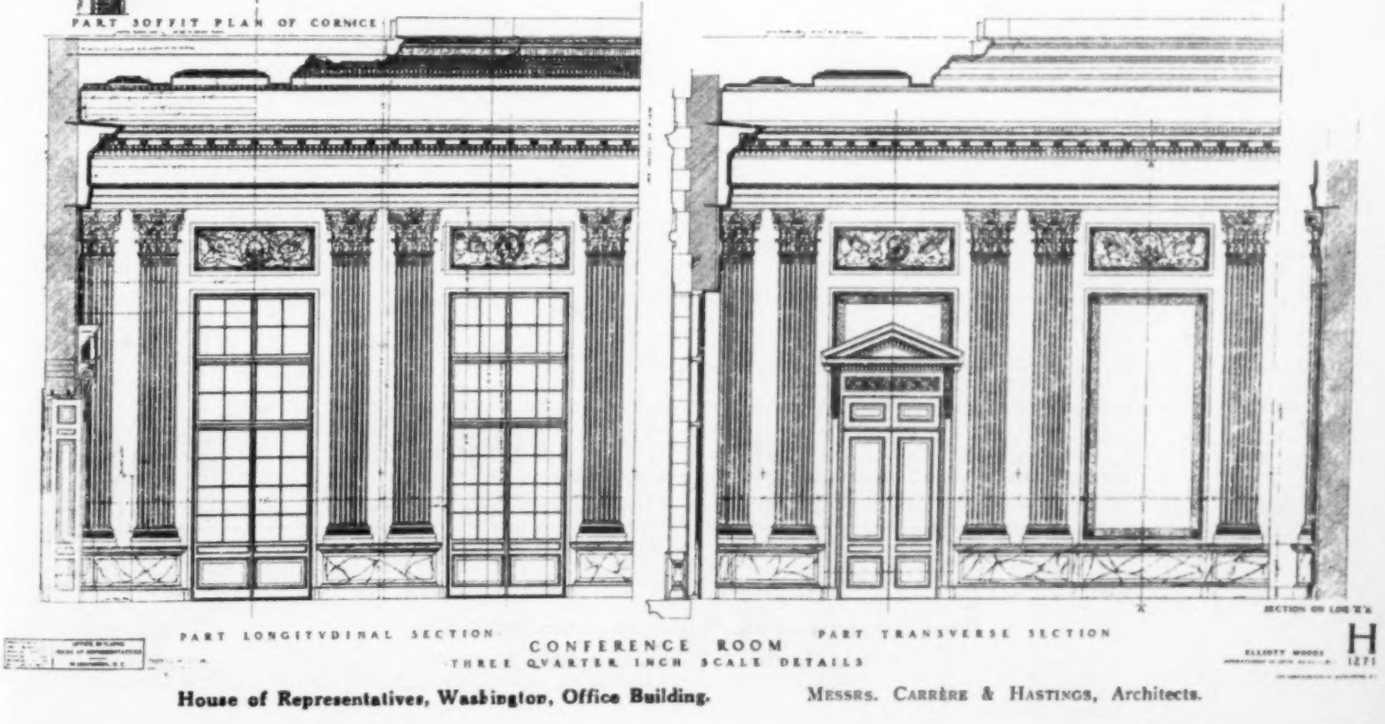
These cottages form part of the Godstone Council Housing Scheme, and the chief point of interest in them lies in the fact that they are the only stone-built cottages erected in the London area under the Government scheme. The stone was quarried on the site by direct labour under a special arrangement made with the London Housing Board. It is of a beautiful golden brown colour and very hard and strong. It is used with a rough chopped face, and the quoins and arch stones are roughly squared. The stone was dressed by an old man named Jupp, who is over eighty years old, and who did similar work for the National Schools opposite, which were built in 1871. Old tiles were used for the roof, and oak barge rafters for the gables. The builders were Messrs. E. Martin & Son, of Oxted. The architect is Mr. Arthur Keen, F.R.I.B.A.

Winforton House, Herefordshire.

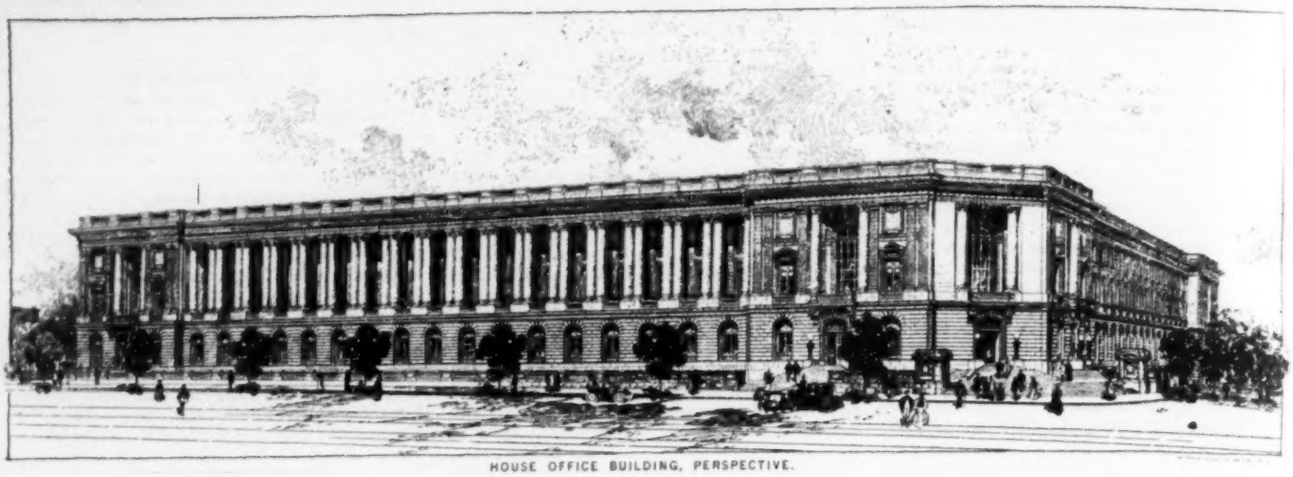
Winforton House stands in the village of that name on the banks of the Wye, about eight miles below Hereford. The house is a fairly typical square-planned eighteenth-century building, with thick stone walls roughcast externally, and is roofed with local stone slates. Joined to the house are kitchen and outbuildings, most of which are part of an earlier farmhouse which stood upon the site. The whole has been altered and added to in the nineteenth century, but it still preserves most of the original work. The present additions consist mainly of new dining room and the formation of an inner hall from existing outbuildings; also the remodelling of the pantry and various offices, with new bedrooms and bathroom on the first floor. Various alterations are also being made to the old part of the house, and a considerable amount of garden work is contemplated. In all the new work the spirit and features of the old house are being closely adhered to. Mr. Michael Waterhouse, A.R.I.B.A., is the architect.

American Architecture.

We also illustrate this week the Pulitzer Memorial Fountain, New York, the M. Knoedler & Company Building, New York, and the House of Representatives, Washington. The architects are Messrs. Carrère & Hastings.

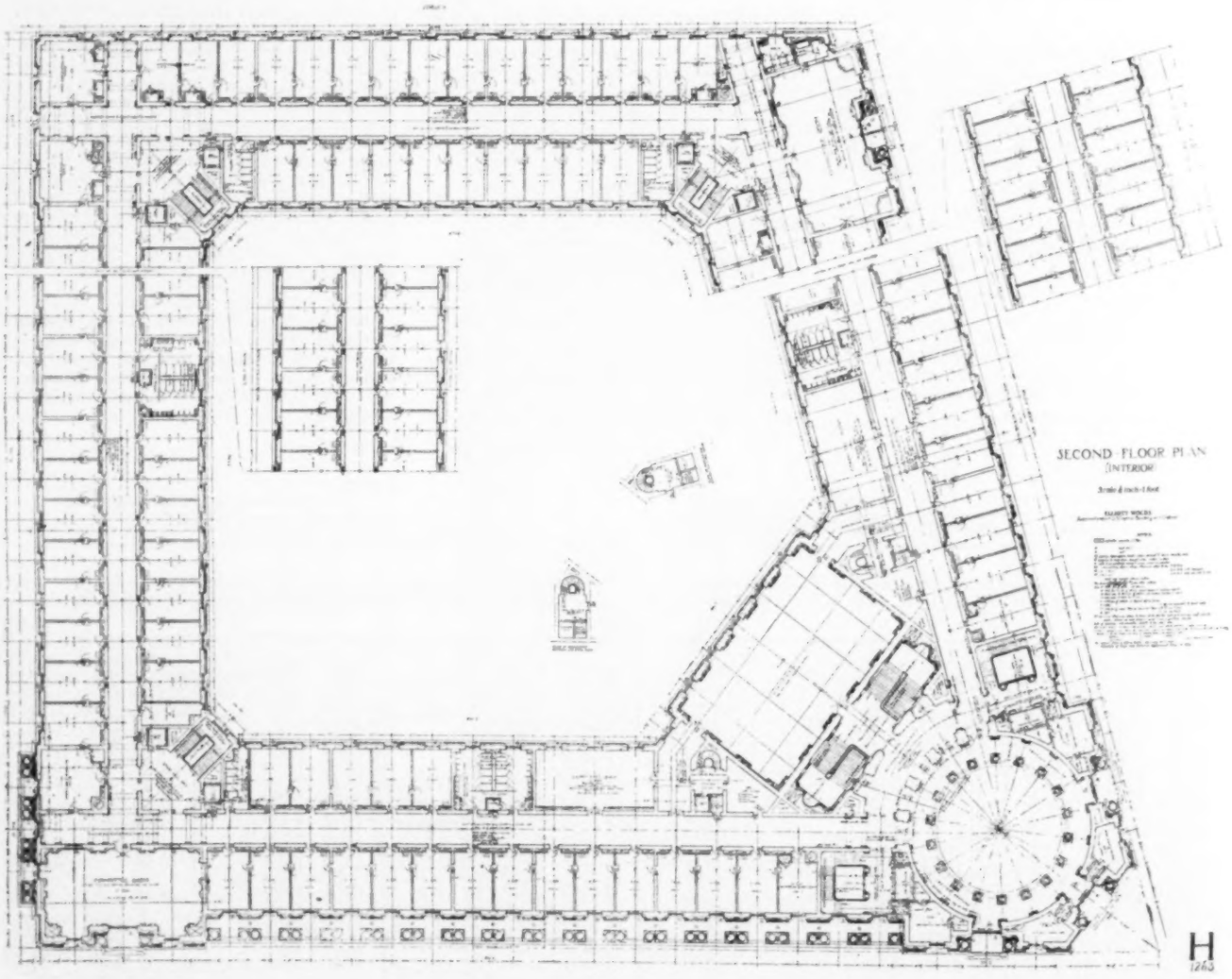


House of Representatives, Washington, Office Building. MESSRS. CARRÈRE & HASTINGS, Architects.



HOUSE OFFICE BUILDING, PERSPECTIVE.

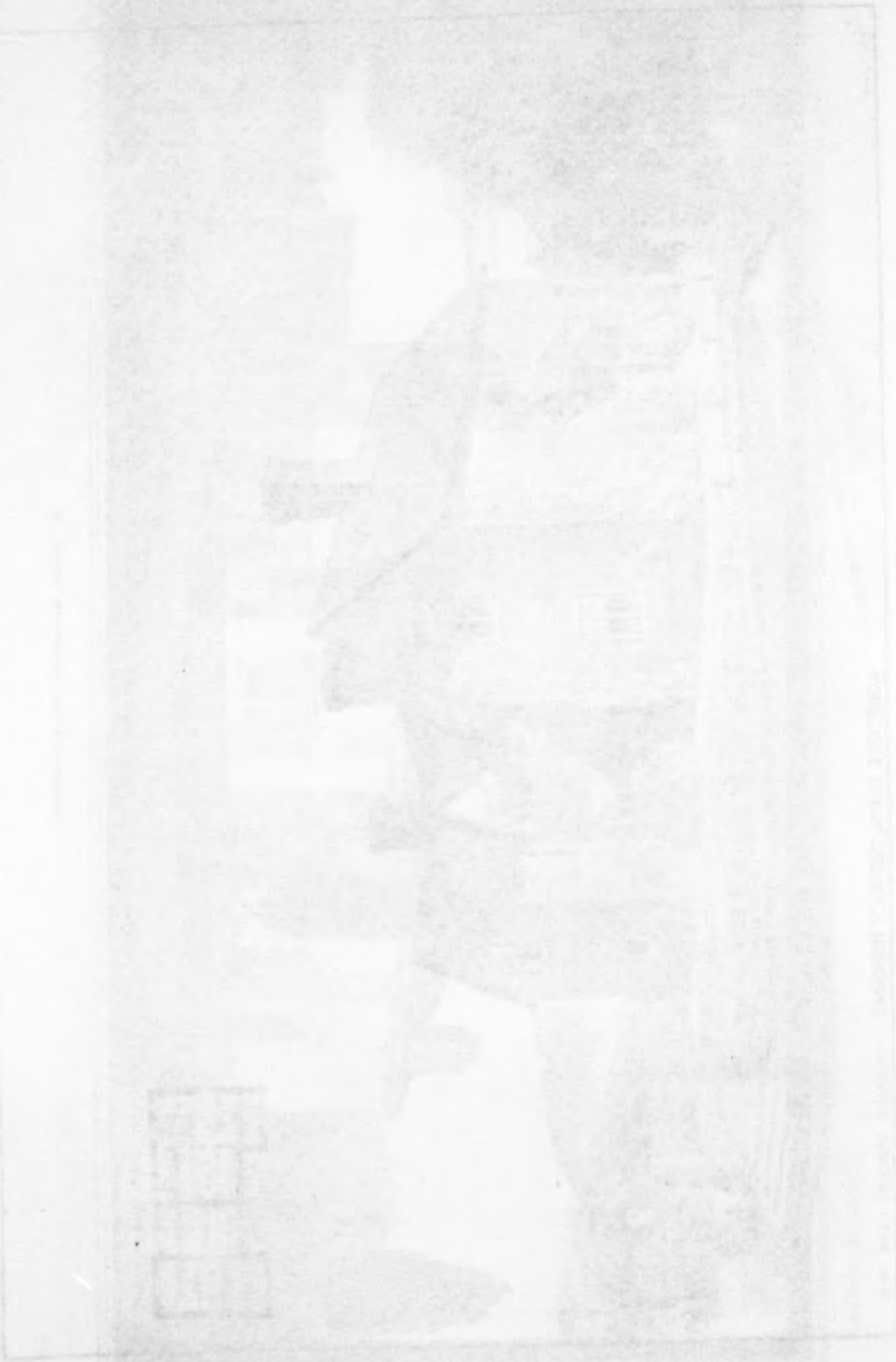
PERSPECTIVE VIEW.



PLAN.

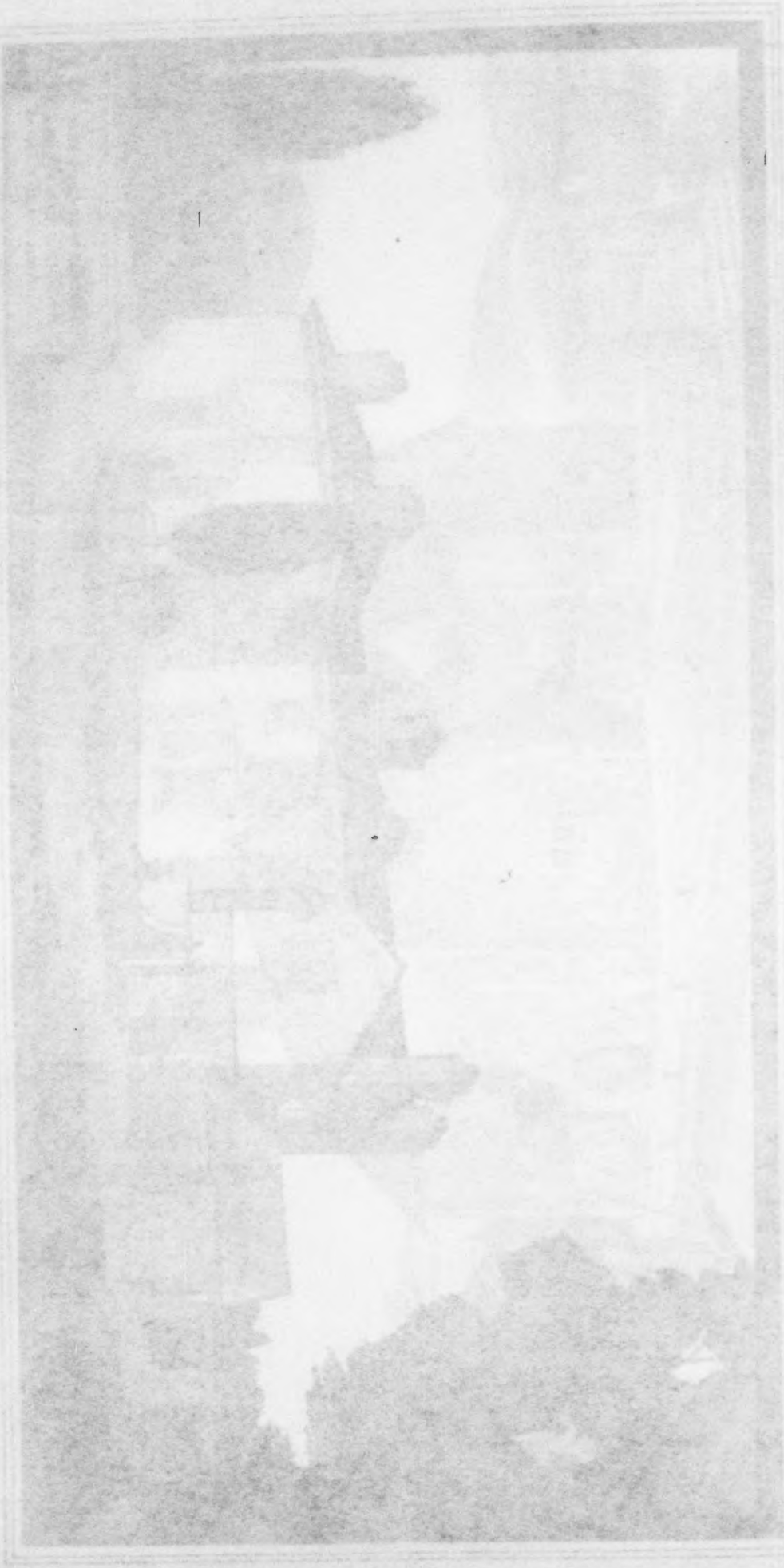
House of Representatives, Washington, Office Building.

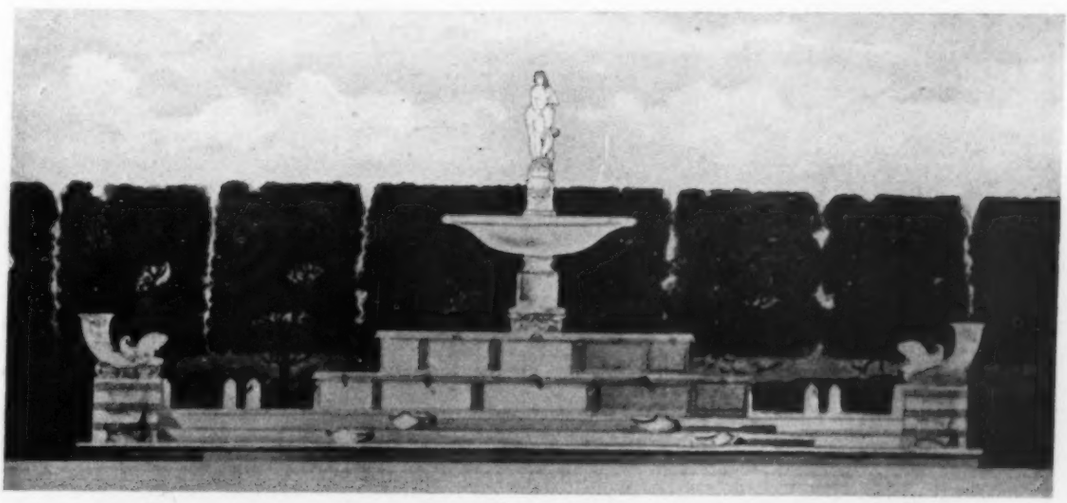
MESSRS. CARRÈRE & HASTINGS, Architects.



MR. ARTHUR KEEN, F.R.I.B.A., ARCHITECT.

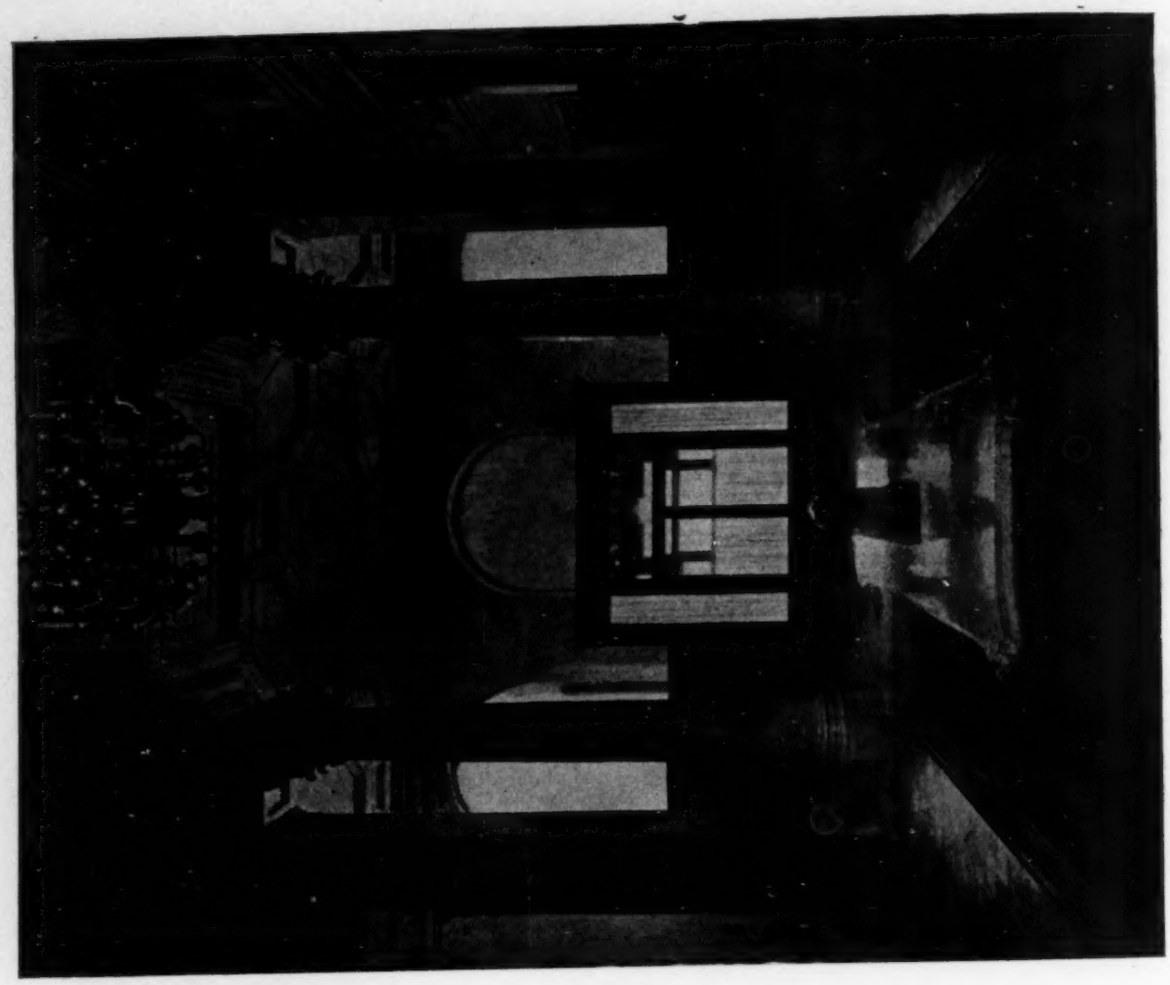
MR. MICHAEL WATERHOUSE, A.R.I.B.A., ARCHITECT.





Pulitzer Memorial Fountain: Plaza, Fifth Avenue and 59th Street, New York City.

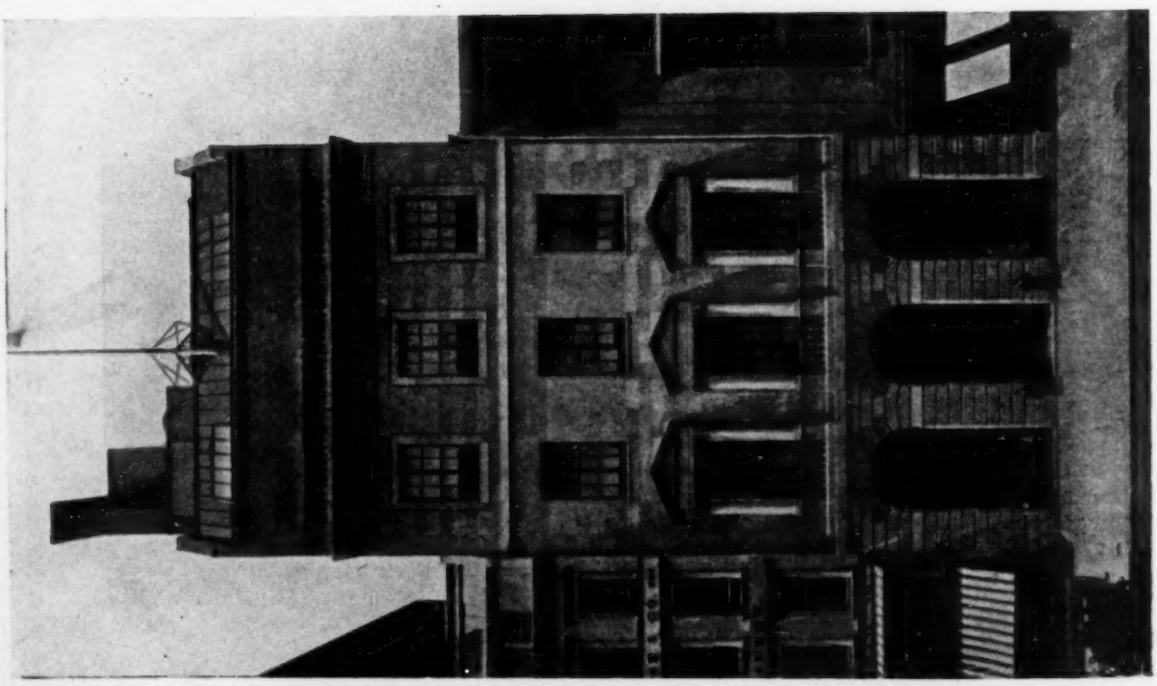
MESSRS. CARRÈRE & HASTINGS, Architects.



THE RECEPTION HALL.

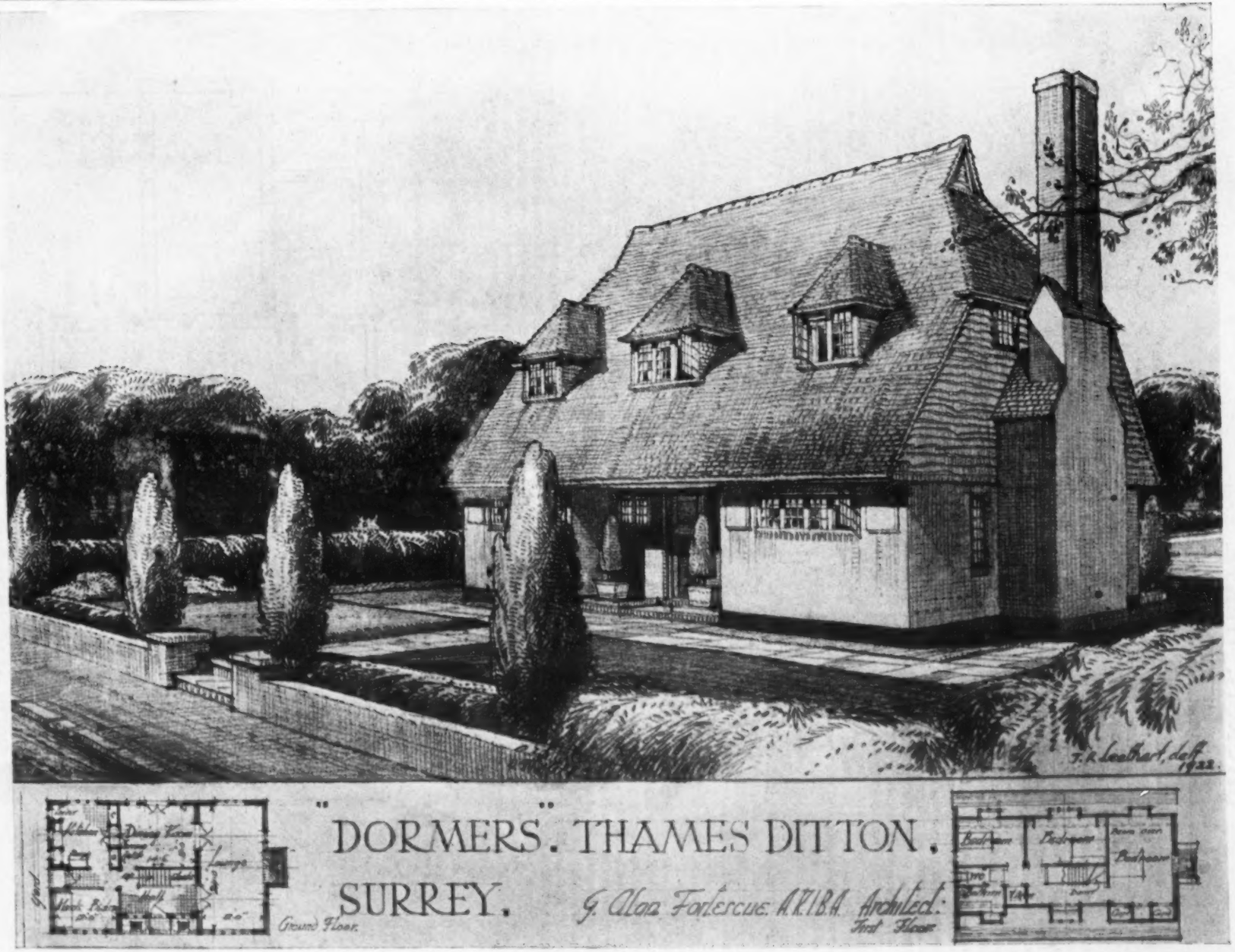
The M. Knoedler and Company Building, Fifth Avenue, New York.

MESSRS. CARRÈRE & HASTINGS, Architects.



Church of The Good Shepherd · Preston Park · Brighton.
Edward Warren inv^t et delt.

PLAN to scale of 1/40TH INCH to the FOOT



[This house is built of brick, covered outside with Portland cement, finished with a wood float, and distempered with "Duresco." The brick plinth is twice tarred. The builders were Messrs. Macey & Sons, of Thames Ditton; the roof was laid by Messrs. Hall & Co., of Croydon, in old brown Sussex hand-made tiles.]

A RURAL ANTIQUITY: SANDRIDGE CHURCH, HERTS.

BY H. V. MOLESWORTH-ROBERTS. (Illustrated by A. SADDINGTON.)

THE little village of Sandridge is situated about two miles from St. Albans, on the road leading to Wheathampstead, whence hailed one of the celebrated Abbots of St. Albans Monastery. The houses of Sandridge are picturesque and tumbledown in character, dating mainly from the early years of the eighteenth century; some are probably older. The projecting upper story is a frequently recurring feature, very familiar in the older thoroughfares of the famous mediæval city near by.

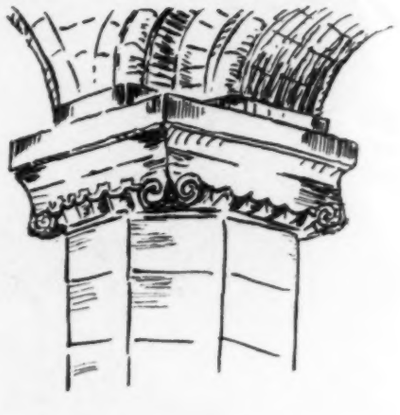
Amidst this straggling group is discernible the curious little church; it is of modest dimensions—about a hundred feet in length—and is built on the normal developed mediæval plan, with west tower, aisled nave and unaisled chancel. Its peculiar charm is rather acquired than immediate, owing to the outward concealment of its most precious treasures, and consists largely in the oddly-contrasting remains of different periods which are there gathered together. The hand of the nineteenth century was here a little more merciful than in many of our churches—at any rate, in the treatment of those of the internal fittings other than mediæval relics.

The exterior, unfortunately, has been so extensively restored that it appears at first sight to be of little interest. The building is approached from the west, so that the tower, with its uninteresting modern flintwork, is first descried. Passing round the south side, however, a different impression is soon gained. Thin red Roman bricks of the type very familiar in this vicinity are seen embedded in the masonry, and at once give a pleasing hint of the great age of the building. The angles of the east end of the nave—to which the aisle walls are now joined—are built substantially of these same Roman tiles, and can safely be diagnosed as of early Norman, if not actually Saxon date. The porch on the south side of the nave is of fairly common type, and has a gable cross (probably modern) at the apex. The outer archway, quite simply moulded, is four-centred in form, and evidently of early sixteenth-century date; the porch itself, however, is probably earlier.

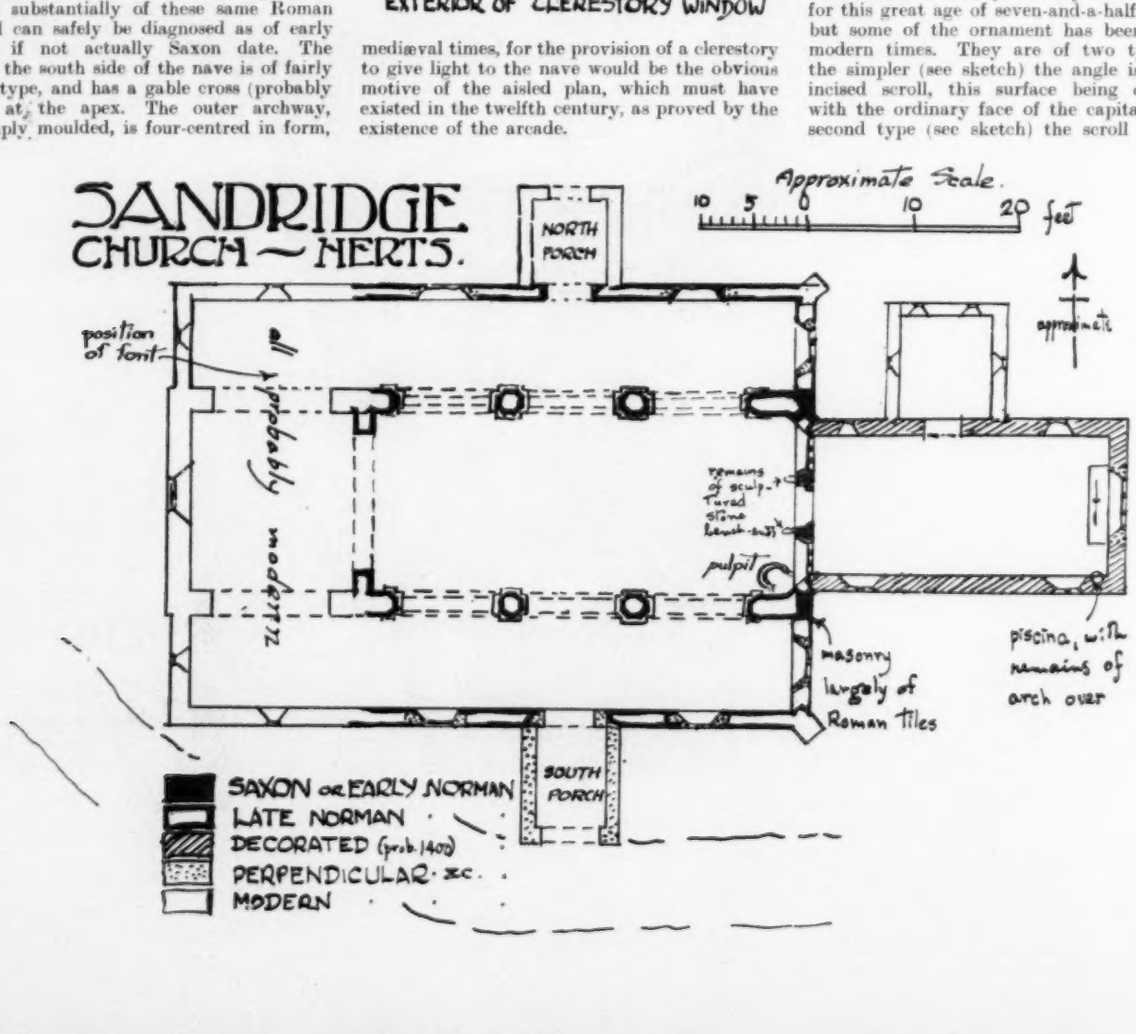
The interior is wholly different from the exterior. It is dimly lighted, and the general effect, as in so many ancient shrines of our country, is mellow and rich in the extreme; even at one glance the trained observer can discern the spirit of past ages. The nave, about sixty feet long, is flanked by a low twelfth-century arcade, above which rises a low modern clerestory of small windows; these, of Norman type (see sketch), doubtless follow the lines of the clerestory, which probably existed in

EXTERIOR OF CLERESTORY WINDOW

mediæval times, for the provision of a clerestory to give light to the nave would be the obvious motive of the aisled plan, which must have existed in the twelfth century, as proved by the existence of the arcade.



The arches of this arcade are of two orders, unmoulded except for a plain bowtell on each. The shafts of the piers are of the plain coursed octagonal type, which are so suitable for the purpose and therefore so usual in parish churches in every period of English mediæval architecture. The scalloped capitals arrest the eye on entering, and are unique and most valuable specimens of late Norman work; they are square on plan, with the typical series of inverted cones (scalloping) on each face, but differentiated from the usual type by the projecting ornament at the corners oversailing the diagonal faces of the shafts. From these they have been called "beak-head" capitals, but "scalloped voluted" would be a more comprehensive description. The general design and deep moulded abacus, with its simple quirk and cavetto, suggest a fairly early Norman date; but the scalloping and volute place the arcade about the middle of the twelfth century, and the plain treatment above them was probably designed to give foil to the decorative forms below. The masonry is very well preserved for this great age of seven-and-a-half centuries, but some of the ornament has been recut in modern times. They are of two types: in the simpler (see sketch) the angle is a simple incised scroll, this surface being continuous with the ordinary face of the capital. In the second type (see sketch) the scroll is supple-



SCALLOPED CAP WITH "PALMETTE" VOLUTE

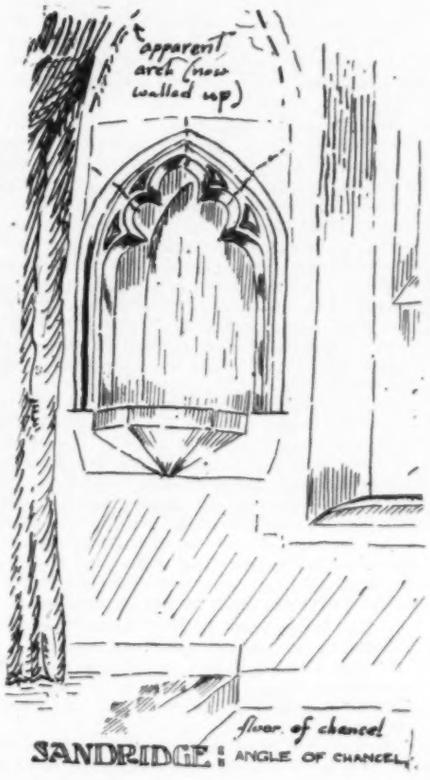
mented by conventional modelled drops of plant form, similar in character to the Greek palmette; each leaf is hollowed out between rounded margins—a peculiar treatment highly suggestive of Classical influence.

The aisles are of no great height, and must have been originally erected in the twelfth century; the masonry of the wall to-day is still probably substantially of this early period. The openings, however, are apparently all subsequent in date. The windows of the church, indeed, form, as is usually the case, an interesting study in themselves. Most of those in the aisles are of two cinquefoiled lights; their flat heads suggest a late fifteenth-century date. Such a form, as is well known, was used much earlier where (as, indeed, in this case) the low aisle roof precluded the provision of the traditional pointed arch; the character of the openings, nevertheless, confirms the maturer date. A few windows at the west ends of these aisles, however, are smaller, of single lights, and, despite their substantial restoration, originally hailed perhaps from the thirteenth century.

The north aisle shelters the very interesting font (see sketch), simple in type, cylindrical in form, and surrounded by incised interlaced arcades; it is therefore of distinctively twelfth-century date—probably late Norman—like the nave itself, and is a valuable relic of the period.

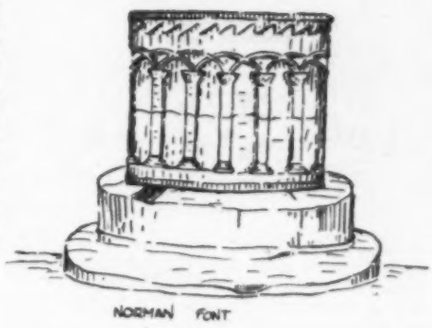
The most remarkable feature of the church, however, is the unusual chancel screen (see sketch), if, indeed, such a term can in this case be used. The lower part, to a height of seven or eight feet, is of stone; the central doorway has a window over, rising higher, and is flanked by smaller traceried window-like openings, whose tablet-flower and hollow on the eastern face announce the date, c. 1400, at which time the chancel is said to have been rebuilt; while finally, the space above, reaching up to the timber roof, is filled with open timber screen-work—altogether a curious assemblage of structural devices. This scheme of design forms a strange contrast to the open timber rood screens most common at the time, and is one of the very few examples of a late Gothic screen of stone extant; the construction, in justice to the material, is accordingly more massive. This arrangement of three apertures, instead of the usual open panelled screen, recalls the triple screen arcade of early Romanesque times; and, indeed, it may owe its form to such an origin, for a very significant feature enters into its design. Over the central doorway is embedded a broad relieving arch of Roman tiles. This, in itself, suggests an early Norman or Saxon date, as do the walls outside forming its continuation, and at first the archæologist is tempted to believe that it is of this early date; but later work occurs beneath it, and one accepts reluctantly the probability that the tiles are coeval with the doorway under, for building work is usually upward in growth. Tiles must have been used, one assumes, because conveniently at hand. Further investigation, however, and inquiry into the history of the fabric, confirm the first assumption; the relieving arch actually was there first, and stood there several centuries before the new openings were inserted. It is impossible to diagnose with certainty the date of such an arch, apart from documentary evidence. Roman bricks were so plentiful in this region that they were used in masses right on into the Norman period, at any rate, to the end of the eleventh century; through the following centuries, as elsewhere in England, they were used, but in a more scattered way, for they were still picked up occasionally. This arch might, on the other hand, date from any time in the Saxon period, probably not long before the Norman Conquest. Whatever date is arrived at applies also to the external angles already mentioned.

It is interesting to reconstruct the appearance of this hallowed fabric in those early days.



SANDRIDGE: ANGLE OF CHANCEL

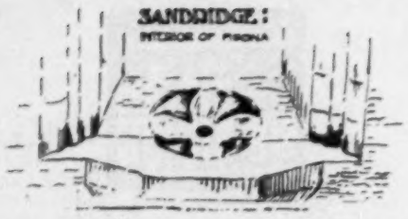
In the middle was the chancel arch proper, which even in Norman times must have been somewhat narrower than the chancel, as we see at Yaverland (Isle of Wight), Broadwater (Worthing), and many other churches to this day. If Saxon, it was probably no wider than the present middle doorway, with solid wall on either side—a primitive arrangement which still survives at Bradford-on-Avon (Gloucestershire) and Escomb, Durham. The existing series of tiles does not seem to have formed the head of the opening, or even to have been concentric with it, the former being too low and flattish in curve; the doorway was probably headed by a small semi-circular arch, also of brick, just below it, though the brick arch may represent a larger semi-circular arch of Norman times. If Saxon, there would probably not be any flanking openings; such an arrangement at this early time was never attempted, except in certain Kent examples betraying Roman influence, such as Reculver, St. Pancras, Canterbury, and the Saxon church at Rochester; columns of Roman type were then used between the openings. But in early Norman times it is possible that either the central opening was found too small, and openings were knocked out at the sides, or the three were originally built together—a fairly common arrangement at that time, adopted because the building craft of the time could not attempt one great arch of a span equal in breadth to the whole, as did later builders. Such an arrangement still exists in the primitive little early Norman church (of Saxon type) at Ovingdean, Sussex. At Hadleigh, Essex (a gem of early Norman date, almost intact) the side openings were so constructed, but were subsequently blocked, and were then pierced by cusped circular openings, probably serving as hagioscopes for the benefit of those in the eastern angles of the nave. In any case, the Sandridge openings probably occupied the same position as the present lights, and their use was doubtless to give the congregation in the nave a better view of the celebration of the Mass.



NORMAN FONT

The intervening space above, between this stone screen and the roof, must once, judging from the screen, have been solid walling; the weight of this would furnish an adequate reason for the brick relieving arch, but such a mass

CHANCEL SCREEN ARCADE, SANDRIDGE



of masonry can hardly have been necessitated. Indeed, some more satisfying purpose of the stonework of the screen must be sought, even if it is necessary to go back to a remoter date, for the thickness far surpasses what may have been needed to support the roof, or even to support the brick arch, had this actually been a chancel arch. A further conjecture must therefore be advanced. Was this so-called screen, and its upward continuation, once a solid wall? There seems no other alternative. If so, either nave or chancel may have existed by itself at some far-off time, and, perhaps, formed a simple rectangular plan, like that of the primitive Saxon church at Heysham, Lancs. The nave was, let us suppose, there before the chancel; yet the central opening, it would seem, was there from the start, and no eastern wall is ever pierced in its centre by a door. On the other hand, the floor level was then no doubt considerably lower, and the broad brick arch may have been a relieving arch, as now. It is difficult to believe it served any other purpose, as we have seen. The present central opening over the doorway—difficult to explain as it now stands—may represent an original eastern window. Much inherent evidence, therefore, supports the assumption, but this hypothesis, far-reaching as it is, can perhaps only be verified by a minute study of the masonry, and the possible recovery of manuscript evidence of the early Saxon times—a not very hopeful prospect.

When the upper masonry, if it ever existed, was removed, and when the present pierced work was inserted, it is difficult to tell; the latter is apparently of fairly modern date. The diagonal recesses flanking the chancel screen are very curious; they were both once lit by openings, and from their position can hardly have served as hagioscopes. It is possible that they contained images, probably representing saints to whom were dedicated the side altars which once have stood before the openings of the screen. The southern one may have been a "sacring window," so placed to permit the sound of the Sanctus bell to reach those outside the church; but its position west of the chancel screen is unusual.

Passing through the arch into the chancel, one perceives several features worthy of close study. The east window, like those in the aisles, is of perpendicular style, as the tracery testifies. The openings on the south, however, are very different in character; their two lights, similarly cinquefoiled, are brought up to a simple traceried head under a pointed arch, and probably date from early in the fourteenth century. In the chancel the most interesting feature is the piscina, a charming and well-preserved example; the cinquefoil cusping of the head is intact, as is also the sunk quatrefoiling of the dish itself, which is partly formed on the slope at the rear of the recess. Its ogee mouldings attest a fourteenth-century date.

The combined impression of these archaeological treasures, the delight involved in their elucidation, and the subdued aesthetic effect of its sacred silences, cannot fail to produce inspiration of a very high order, and even one hurried survey, with the bewildering succession of delights it carries with it, cannot fail to convince the traveller that in no other direction can be found so sweet and so enduring a source of pleasure and so permanent a solace from the world without.

[Records attest the fact that the masonry of the chancel screen extended farther upward than at present and that this upper part was removed in 1886. The clerestory is modern, but probably follows the Norman prototype.—H. V. M. R.]

THE COST OF BUILDING.

THE Council of the National Federation of House Builders desires to draw public attention to the cost of building, and to the misunderstanding which is said to have arisen through statements made by the Ministry of Health which do not apply to the ordinary builder. It is pointed out that it places both the builders and the prospective buyer of a house in a very difficult position when statements have been issued by the Government that the cost of building is 60 to 70 per cent. over pre-war, when the builder, however anxious he may be to build a cheap house, cannot do so under 125 per cent. over 1914 figures. In view of this position the Federation has issued the following statement:—

The General Committee of the National Federation of House Builders desires to draw public attention to the cost of erection of houses in view of the great prominence which has been given by the Ministry of Health and the Director-General of Housing to the contracts recently placed for houses by certain local authorities at remarkably low figures. The Committee welcomes the fact that a considerable drop in costs has taken place during the past year, but regrets that the reduction in the cost of building villa property does not correspond with the figures published by the Director-General of Housing.

Any comparison between the cost of a "council" house and that of a house erected to be sold to an occupying owner is impossible, for the one is a mass production article with every little embellishment ruthlessly cut away, and the other has the individuality, the comforts and conveniences of a home. In order to form a just estimate of the cost of building even of Government houses, the following matters should be observed—they have been overlooked in the statements made by the Government:—

1. The Government "£300" house does not include the cost of land, roads nor sewers.

2. The accommodation is inferior and the specification does not conform to the acknowledged standard of requirements in many respects.

3. The price of at least one of the advertised schemes is lower than any builder of experience could possibly quote, and thus the figure announced by the Ministry is no guide to the cost of building.

The Committee of the Federation desires to draw attention to the following facts:—The statement reported to have been made by Sir Charles Ruthen that the cost of building is now 60 to 70 per cent. above pre-war is inaccurate and misleading. The cost of building at the present time varies in different parts of the country, but on the average it may be said to be 125 per cent. above the cost of 1914.

The following are the detailed general prices of certain materials and wages at the present date with those prevailing in 1914:—

Wages—	1914. £ s. d.	1922. £ s. d.	Increase, per cent.
Skilled, per hour	10..	1 8	118.75
Unskilled "	6..	1 3	
Common bricks, per 1,000	24 0..	61 0..	154.16
Timber, per standard	10 15 0..	21 10 0..	100.00
Cement, per ton	50 0..	70 0..	133.33
Roof tiles, per 1,000	33 0..	85 0..	157.57
Baths, each	50 0..	110 0..	120.00
Glass, per ft.	2..	4	100.00
Doors, each	6 0..	15 0..	150.00
Plaster laths, per bundle	10..	2 9..	230.00

It is impossible to state any general figure of cost for a house of given accommodation built for sale to an occupying owner; the cost of houses even of the same size in the same town varies, for the value of the land, the nature of the fittings, and the design of the house all have a direct effect upon the cost of building. The prospect of any further substantial reduction is remote, for wages are now fixed until March 1, 1923, and the item of wages amounts to 75 per cent. of the total cost of building, including the wages on the manufacture of material used in the job. There is little prospect of any great fall in the rate of wages, which is governed by the final law of supply and demand. There are probably only half the number of men available for house building in the immediate future, as compared with the number who were engaged in the various trades when building was at its height, and any revival in the trade is bound to lead to a very serious shortage of labour, which will prevent any further reduction in the rate of wages. It is more than probable that the cost of housing will become stabilised for some years at a little above double pre-war figures.

The house builders of the country have been prevented by various circumstances from carrying on their business during the past ten years. Investors have been discouraged from buying houses by the various Acts of Parliament affecting house property which have destroyed all confidence. Prices have been rushed up to impossible figures by reckless schemes, and the people of the country have been encouraged to expect housing conditions which were absolutely unattainable. When all this chaos has subsided and the country realises that housing must be an economic business governed by hard financial rules, the house builders will be able to resume their business, and the acute house famine which we are now experiencing will become a nightmare of the past.

In a statement made at Bedford last week, Sir Kingsley Wood, M.P., Parliamentary Secretary to the Ministry of Health, said: "The 'rings' which have kept up the price of house building are breaking up; materials are cheaper; the private builder will soon find it profitable to resume building, especially for the middle classes. The housing problem has now entered on a new phase. Conditions are much more favourable to a more rapid rate of building. Houses completed last year numbered 100,923—actually 30,000 more than the average output of working-class houses by the building industry during the ten years before the war."

In reply to the statement of the Federation; the Ministry of Health, according to *The Times*, points out that "the figures supplied by Sir Charles Ruthen, and according to which the cost of building houses is now half what it was a year ago, are based on the actual price of tenders received for the erection of houses. Among other things, Sir Charles Ruthen stated that houses which cost £816 in April, 1921, were now being built at Nottingham and Leicester for less than £300. . . . The statement that there was no proper comparison between the cost of the plain 'mass production' housing scheme dwelling and an ordinary private villa was not by any means generally true in its application. A number of the schemes which went to make up the average figures were quite small ones, dealing perhaps with only sixty, twenty, or even five houses, so that in these instances there could be no such thing as 'mass production.' The real answer to the Federation was that tenders had been approved and houses built at the figures quoted by the Ministry."

OBITUARY.

Mr. Charles Blandford, builder and contractor of Hove, passed away at the age of 76 on Wednesday last week.

The death has occurred, at Brighton, of Mr. Peter Stuart, the inventor of "Granolithic" paving and building stone.

Chiswick Civic Association.

In connection with the Chiswick Civic Association, a social sub-committee has been formed, and an interesting programme has been arranged for the winter months of 1922–23. Applications for further information should be made to the Hon. Secretary, 98, Sutton Court-road.

Greenwich Borough Council, Charlton Housing Estate. Houses Type B 3, South Aspect.

MR. ALFRED ROBERTS, F.R.I.B.A., Architect. (*See p.* 420.)

GREENWICH HOUSING SCHEME.

OWING to the extreme shortage of houses and insanitary environment of the existing old types in the Borough of Greenwich, a housing scheme was initiated by the Borough Council in 1919, when a site of about 43 acres was acquired at Charlton, a pleasant old-world village forming part of the Borough of Greenwich. The site abutting on the south side of Charlton-road is adjacent to the fine old Tudor house and park, formally in the occupation of Sir Spencer Maryon Wilson, Bart., and formed a portion of the estate belonging thereto. The design of this mansion is attributed to Inigo Jones, and was built by Sir Adam Newton about 1607 for his pupil, Prince Henry.

The upper part of the site is flat, but the lower portion is beautifully undulating, and there are fine views over the River Thames to the Essex hills; in the centre is a woody dell, which is proposed to be taken over as a public park by the London County Council. Access is readily obtainable to the various factories and works in the vicinity by means of trams and omnibuses and, with the fine open spaces of Woolwich Common and Blackheath close by, it is an ideal situation for a community of this nature.

The lay-out and house plans were prepared by Mr. Alfred Roberts, F.R.I.B.A. The total scheme includes 232 houses the majority of which are occupied. The greater number have been constructed by the Guild of Builders (London), Ltd., and the remainder by Messrs. W. J. Maddison, Ltd., and Mr. D. Draisey. A contract was recently entered into with Messrs. Roberts (Birmingham), Ltd., for a further 80 houses, and as the demand for these houses is far more than the supply, it is hoped that the Borough Council will be able to continue their scheme.

The roads and sewers are being constructed by the Borough Engineer and Surveyor; the main roads were already determined, with the exception of Hanging Wood-lane, formerly practically only a footpath but now converted into a roadway 45 ft. wide. The roads for minor traffic were designed to suit the various contours and avoid excavation both in their construction and for foundation of adjoining houses, and the old gridiron type of lay-out has been carefully avoided. The paths are paved down the centre and have grass verges; the trees on the estate have been preserved as far as possible. The Ministry of Health's limitation of twelve houses to the acre has been more than followed, also the minimum width of 70 ft. across roads between the houses; hence the frontage and garden space is ample. A site is being provided upon the Estate for a County Council School, selected to obviate, as far as possible, children having to walk long distances and cross main roads.

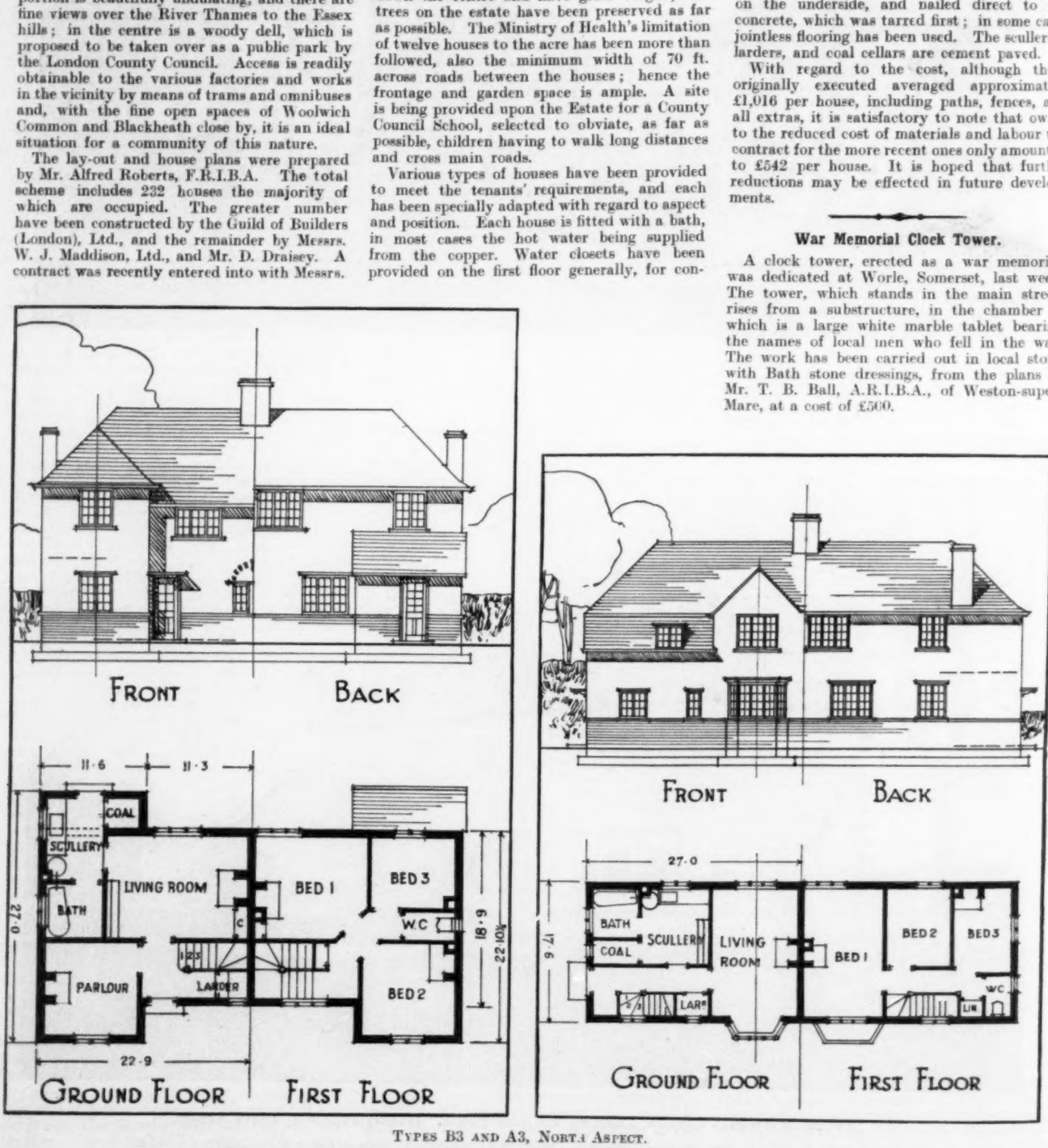
Various types of houses have been provided to meet the tenants' requirements, and each has been specially adapted with regard to aspect and position. Each house is fitted with a bath, in most cases the hot water being supplied from the copper. Water closets have been provided on the first floor generally, for convenience of night service, &c., as a special variation from the Ministry's type plans. The lighting is by means of gas, and gas cookers are provided. The roads are lighted by gas standards, placed in the front gardens and overhang the paths to avoid the unsightly old type of standard on edge of pavement. "Interoven" stoves are fitted in the living rooms of non-parlour houses where no kitchen ranges are provided.

The construction of the houses throughout is in brickwork faced with red or stock bricks, some being roughcasted; and the roofs are covered with both plain, Danish, and concrete tiles, also slates, to avoid uniformity. The foundations, where necessitated by the site, take the form of light concrete reinforced rafts, and every care has been taken to effect economy in this costly portion of the construction. The ground floors generally are boarded, creosoted on the underside, and nailed direct to the concrete, which was tarred first; in some cases jointless flooring has been used. The sculleries, larders, and coal cellars are cement paved.

With regard to the cost, although those originally executed averaged approximately £1,016 per house, including paths, fences, and all extras, it is satisfactory to note that owing to the reduced cost of materials and labour the contract for the more recent ones only amounted to £542 per house. It is hoped that further reductions may be effected in future developments.

War Memorial Clock Tower.

A clock tower, erected as a war memorial, was dedicated at Worle, Somerset, last week. The tower, which stands in the main street, rises from a substructure, in the chamber of which is a large white marble tablet bearing the names of local men who fell in the war. The work has been carried out in local stone with Bath stone dressings, from the plans of Mr. T. B. Ball, A.R.I.B.A., of Weston-super-Mare, at a cost of £500.



TYPES B3 AND A3, NORTH ASPECT.

Greenwich Borough Council's Charlton Housing Estate. MR. ALFRED ROBERTS, F.R.I.B.A., Architect.

BOOKS.

Fire Prevention and Fire Protection By JOSEPH KENDALL FREITAG, B.S., C.E. Second edition revised. (New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Ltd. 1921.) Price 30s. net.

THIS excellent and exhaustive handbook is introduced with a chapter upon financial loss due to fires, which shows that America has an unenviable priority over the countries of Europe in the matter of fires and fire losses. Interesting figures are given showing an increase of fire losses year by year and comparing the losses of different American cities with one another, and with European cities where the *per capita* cost of fire damage is much smaller.

The author accounts for the difference in the relative greater care taken by each individual in Europe and his highly-developed sense of responsibility. In this he is borne out by the number of European fires which are quelled before they have extended beyond the confines of the rooms in which they originate. "In the United States we are so prone to consider the rights of the individual, that we are apt to overlook the rights of the aggregation of individuals." The author here expresses one of the most important causes of American fire loss, which is part of the price paid for individual freedom. The climate and material resources are also favourable to risk of fire. Plentiful supplies of pine timber suitable for building purposes, in some respects, though highly inflammable, have encouraged the erection of frame buildings over large city areas. Extreme cold in the winter season frequently causes the protective water supply to freeze; and in the midst of conditions such as these, a building of sound fire-resisting construction is practically defenceless. In several of the great conflagrations in American cities fire-resisting buildings have been subjected to such enormous heat from the outside that their wired glass windows have melted, the cast iron window mullions warped and cracked, the stone calcined, the brick faces scaled; and Americans are learning at last that "fireproof buildings must stand in fireproof cities." Half measures are merely wasteful and delusively dangerous. Instances are given of the damage due to fire in buildings accepted by insurance companies as being of satisfactory fire-resisting contruction.

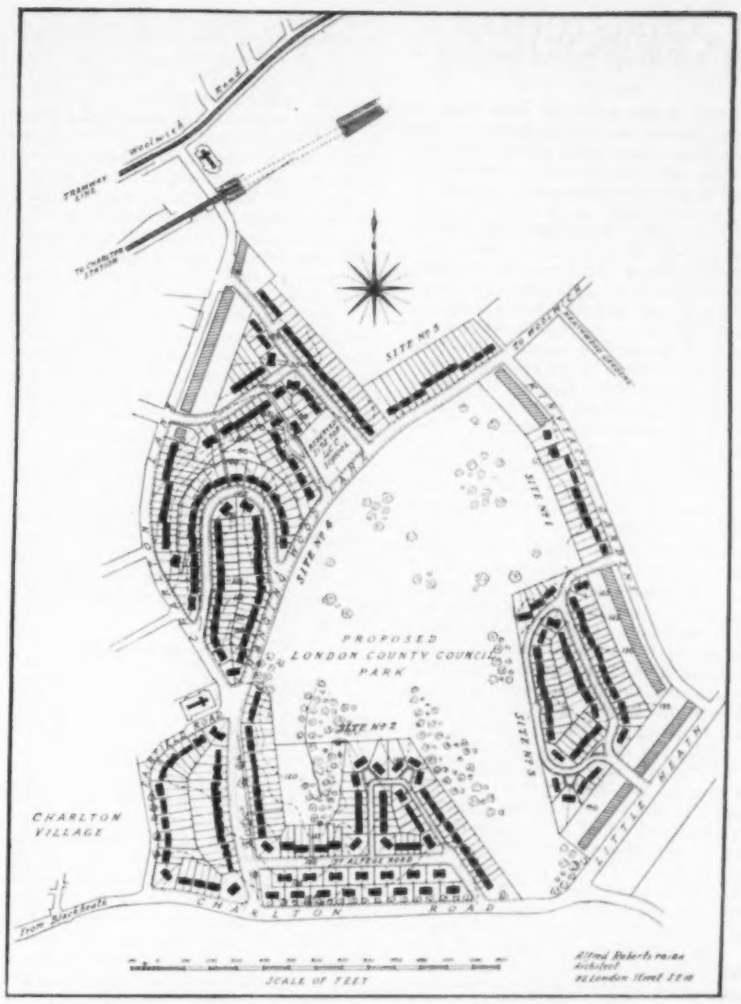
The results, in many cases, serve to show the inadequacy of the use of fireproof materials when erected under the stimulus of commercial and financial considerations, and where minute supervision from the fire protection point of view has not been enforced. A building-owner who puts in fire-resisting construction merely in order to decrease the premiums demanded by the fire insurance company, and who is only subjected to occasional inspection, is not likely to produce really efficient fire protection. The disastrous fire in the Asch building in New York instances the importance of the disciplined use of fire protective measures in the occupancy of a building as well as in the materials of its construction. Here, the inflammable fabrics crowded into the large workrooms in the eighth and ninth floors of a ten-story building involved loss of life, notwithstanding the fact that the damage to the building was comparatively slight. A similar lack of any sense of responsibility combined with injudicious planning of exits resulted in loss of life in the Iroquois theatre fire, where a building supposedly fireproof was turned into a death-trap by the disregard of well-understood precautions.

The effect of planning in relation to the position of staircases, internal courts, the suitable division of buildings by fire walls, is discussed in the light of actual results. The value of the fire-wall lies in the fact that the occupants of the half of the building which contains the fire can gain temporary safety on the other side of the fire-wall without having to congregate at the staircase and thus causing a stampede. Each part of the building is provided with access stairs so that if one stair is rendered inoperative the other is available.

Much valuable information is given concerning materials and methods to be employed in fire-resisting construction. Masonry, even when employed in considerable mass is found to be extremely unreliable. Architectural faience has also been found less satisfactory than was hoped at one time. Brick and porous or semi-porous terra-cotta and suitable forms of reinforced concrete have been found satisfactory. Plain surfaces without ornamental or structural projections are found to suffer least in case of fire. A special form of tile construction named after the inventor, Mr. Rafael Guastavino, an architect and native of Spain, has also been found excellent. Floors of enormous span, domes and vaults, have all been erected on this method, which dates back, in its original, to the work of the Moors in Spain.

Farm Buildings and Building Construction in South Africa. By W. S. H. CLEGHORNE, B.Sc. (Edin.), A.M.I.Mech.E. (London: Longmans, Green & Co. Price, 25s.)

This very practical book on building construction has one outstanding merit, rare in works on this subject, and that is of being composed throughout from one point of view. The result is that the book can be read as well as kept for consultation, each successive chapter dealing with some part of the normal South African farm. Farm buildings are described in full detail with dimensions and a reasoned discussion of alternative methods, the practice of England and of the Dominions being cited. Points in building construction are elucidated with great patience and skill and the clear diagrammatic illustrations should appeal to the farmer who has to undertake his own construction as well as to the builder. No parade is made of architectural knowledge or taste, but the solution of the practical problems seems to have worked out a quite presentable style of architecture based upon common sense and capable of developing the unconscious picturesqueness that often follows the adaptation of local materials. A chapter on brickmaking is given in the body of the work and information concerning reinforced concrete calculations is introduced in an appendix. Another appendix deals with the subject of thatching and in the preparation of the roof timbers for this method of covering. Alternative diagrams are given for the construction of trusses with rough poles or with sawn timber. The second edition of the book should have a very extended sphere of usefulness, for anyone who proposes to take up farming as a career will be well advised to purchase and study it.



Greenwich Borough Council Charlton Housing Estate.
MR. ALFRED ROBERTS, F.R.I.B.A., Architect. (*See p.* 420.)

BOOKS RECEIVED.

MANUAL OF REINFORCED CONCRETE. Fourth edition. By Charles F. Marsh and William Dunn. (London: Constable & Co., Ltd.) Price 21s. net.

BEETLES DAMAGING SEASONED TIMBERS. By A. M. Altson. (London: William Rider & Son, Ltd.) Price 2s. 6d.

THE ROADMENDER COUNTRY. By Lorna Leigh. (London: The Homeland Association, Ltd.) Price 7s. 6d. net.

ELECTRICAL CONTRACTORS' YEAR BOOK, 1922–23. (London: The Electrical Contractors' Association, Inc.).

SIR CHRISTOPHER WREN AND HIS WORKS.*

MR. GORDON HEMM adds one more book to the long and interesting list of works on this most fascinating personality, whose architectural triumphs savour so strongly of adventure, inquiry and experimental research. Admitting at the outset that Wren's early work fell short of that of Inigo Jones' in academic propriety, Mr. Hemm shows how, by study and by a short period of foreign travel, Wren was able to infuse classical elements into his great achievements in scientific construction and economical planning, but although the trip to Paris in the summer of 1665 coloured the master's work with something of the manner and detail of the French Renaissance, the early habit of thinking out his designs as constructional problems continued to the end a leading characteristic. Perhaps it is just this combination of manner and matter that gives perennial interest to these designs; artistic and practical considerations are blended in such a way as to provoke the attention of all parties and to elude the limitations of arbitrary rules of ordinary classical composition or criticism.

The author justly praises another aspect of Wren's work in remarking upon its fine colour and texture and the suitable and economical way in which the materials of construction are made to contribute to the artistic effect. In this respect it is interesting to compare his appreciative description of the small church of St. Benet's, Upper Thames-street, with the slighting notice of the same building in "The Churches of London," by Godwin & Britton (1838), where it is said to be "small and unimportant" and "without any distinguishing features of excellence," and "of the exterior of the church we are unable to speak more favourably than of the interior." Mr. Hemm more feelingly writes: "St. Benet's, Upper Thames-street, externally is a picturesque composition. The architect deals with two materials, brick and stone, obtaining a design of much variety and pleasing texture. The elevation to Upper Thames-street, consisting of three long windows with semicircular brick arches and rich swag decoration above, is attractive and is framed in by angle quoins of brick and stone terminated by a refined cornice. A slight break back in the wall face, including the pediment-headed doorway, completes this front. The tower is a modest piece of design in the true Renaissance." Plate II, which shows the entrance to the church, bears out the truth of the text. Many other City churches are described in detail, and three types of roof coverings are tabulated as follows:—

(1) The ceiling flat containing a deep plaster cove.

(2) Dome with arched recesses including detached columns.

(3) Ceiling of nave covered with wagon vault, ceiling to the aisles flat or groined.

The graceful interior of St. Stephen's, Walbrook, is used to illustrate the second type of design, and a sketch of its interior on Plate 4, together with the plan and section on Plate 3, makes the beauty of this architectural gem clear to the reader. The effective, though less original designs of St. James's, Piccadilly, and St. Bride's, are illustrated by plans and sections in Plates 5 and 6, and the four Plates—7 to 10—contain sketches of Wren's wonderful towers and spires where mechanical ability and creative artistry once more go hand in hand.

Those who have not seen the actual works can hardly believe in the extreme lightness of some of Wren's steeples, where the compressive strength of the thin stone shell is often complemented by the use of reinforcing tie bars and metal cramps. Like the brilliant contemporary artists in France, Wren was putting into practice the laws of mechanics rediscovered and formulated by Sir Isaac Newton, and the conscious exploitation of tensile strength in chainage and reinforcement marks off the architect of the Renaissance from those of the preceding Gothic period, when strength of material in compression and cross stress had been considered the essentials of building construction. A feeling for structural continuity of material is evident in much of Wren's work. The rich terminations of his towers are almost invariably preceded by stories of plain masonry, and the great peristyle of St. Paul's dome stands upon an unbroken circular podium, well exhibited in Plate 16. Although influenced in favour of the prevailing fashion of columnar treatment, Wren frequently succeeded in breaking away from it and allowing his walls to express themselves by their colour and texture without the aid of columns or pilasters. It is possible that a great part of his artistic success is due to the efficient handling of the simpler constructional elements of design and the provision by their means of an adequate foil to whatever ornament he introduced into his architectural compositions.

This book contains references to Wren's ability as a town-planner, and the map showing his proposed lay-out for London after the Fire forms the subject of Plate I. This aspect of the architect's genuis is again touched upon in the description of the palaces of Hampton Court and Greenwich, where the masterly lay-out is combined with admirable architectural grouping and use of material.

* By Gordon Hemm. Illustrated with pen and ink sketches by the Author.

SOME IMPRESSIONS OF AN ARCHITECTURAL STUDENT IN SWITZERLAND.

IT is not usual to look to Switzerland for ancient buildings which have set a style to be copied, and given inspiration to architects of all countries in search of ideas. In the larger towns the architecture is, according to the proximity to the respective frontiers, of a French, Italian, or German type. But a holiday in Switzerland can show much of architectural interest. It is in the country towns and villages where the characteristic Swiss building is found. Something—perhaps the atmosphere—has a singularly preservative effect on the structures; it is quite common to find a village church, for instance, which has been built for 150 or 200 years but looks no older than 50 at the most.

The churches generally have Gothic pointed arches over the doors and windows, and are constructed in brick entirely covered on the outside with a cement rendering. The slender spire is characteristic, or sometimes a tower is seen with steep roof and four gables, with a hip rising from each, common to the German Romanesque architecture. At other places the tower roof has ogee-shaped gables, containing clocks, surmounted by an ogee dome, as at Vitznau, on the Lake of Lucerne. Internally, the walls of the churches are plastered, and painting is used round the openings, in imitation of mouldings. Shadows are painted on them, and at a distance are very deceptive. The caps to pillars are cubiform, or have faces and foliage carved on. Hammer-beam roof trusses are largely used, and carved and coloured in bright red, blue, and gold, while liberal use is made of metal rosettes. Winged saints of typically Swiss expression gaze down in solemn dignity on the worshippers. At Stans, the crypt contains the skulls of various local celebrities tastefully arranged on shelves, and it is said that there is great keenness amongst the inhabitants to live a life so worthy that one day their skulls may adorn the walls of the crypt. In a small chapel in the churchyard is a wooden group, clothed in what were once brightly-coloured robes, representing the scene in the Garden of Gethsemane. The crosses erected over the graves in many cases bear a photograph of the deceased, a custom of most German cemeteries.

Most of the well-known mountains have hotels built on their slopes or summits. It is a matter of speculation as to the cost of these buildings,

A Swiss Chalet.

with the natural difficulty of getting the materials on to the site. The hotel on the Stanserhorn is at 7,000 ft., and on one side is on the slope of the hill, which at that point is nearly 60 deg. The wall is 30 ft. high before reaching the basement floor, and is in rubble taken from the surroundings. But all the rest of the material had to be brought up from Stans, at the foot of the mountain. (Perhaps it is the cost of these hotels which accounts for the price of coffee or chocolate being nearly 1s. 6d. a cup!)

Everyone has seen photographs or models of the picturesque wooden chalets of the Swiss, with their large overhanging eaves and green shutters. The charm of these little dwellings is intensified by the beauty of their surroundings. Some idea of this may be obtained from the accompanying illustration. Most chalets have a balcony supported on richly-carved brackets. The roofs of those situated high up have long cross battens along the tiles or shingles. On these battens at intervals of about 3 ft. large boulders are placed to keep the roof down in case of sudden storm. The gutters are often continued beyond the termination of the eaves to a length of some 3 to 6 ft., where the rainwater is allowed to drip straight on to the grass.

In the higher districts earthenware pipes are seldom used, as they invariably crack owing to movement of the soil. Each chimney has its own little roof for keeping out the snow—it is the extravagant roof cutting that constitutes the charm of the chalet. Only in the summer is it possible for these mountain folk to spend all their time on their farms. In the winter they devote their days to wood-carving, and every village of any size has two or three shops full of the work of these wood carvers. Mountain people are said to be essentially artistic, and the Swiss are certainly well ahead in this respect.

Chesterfield's Crooked Spire.

According to a report by Mr. A. W. Cooke of a test made of the crooked spire of Chesterfield Parish Church, the spire leans 7 ft. 6 in. to the south, 7 ft. 10 in. to the south-west, and 3 ft. 2 in. to the west. It would thus appear that the spire is 12 in. more out of plumb than it was in 1842, when Mr. (afterwards Sir) Gilbert Scott made an examination. The church officials are awaiting a full report from Mr. Leslie Moore, architect, before considering whether it is necessary that anything should be done to strengthen the spire.

Lectures on Architecture.

Sir Banister Fletcher, F.R.I.B.A., will on Wednesday evenings at six o'clock deliver a course of twenty-four University Extension Lectures on "The History of Architecture (Part III, Renaissance and Modern)," at the Central School of Arts and Crafts, Southampton-row, W.C. The lectures will include a consideration of the Renaissance architecture of England, France, Germany, Belgium, Holland, Italy and Spain, and will be fully illustrated by special lantern slides, photographs, diagrams and models. The introductory lecture, which will be open to the public without tickets, will be held on Wednesday, September 27.

THE BUILDING TRADE.

SPECULATIVE BUILDING AND THE HOUSING PROBLEM.

IN the course of an address at a recent conference of building instructors at the London Central School of Arts and Crafts, Mr. Walter Cook said the point that cut at the root of the housing problem was the question whether or not the majority of occupiers should be looked to to pay what was called an economic rent, which he took to be a sufficient rent to return such interest on capital invested in building as would induce investors to provide it. It must be remembered that even if public authorities were to provide the whole of their housing accommodation, they would still have to pay economic rents indirectly in the form of rates or taxes. It was important to remember that there was a considerable section of the community (apart from the wastrels of society) consisting of people who could not for various reasons afford to pay economic rents. It would seem to have been necessary in order to make up leeway and to keep up with annual requirements that no less than 900,000 working class houses should have been provided by this time, towards which they had at the present moment only about 156,000 (including houses still building). Those figures were startling, but they were based upon the most careful and thorough investigation, and must be taken to represent the official view of the needs of the country. The general opinion of estate agents and others was that the shortage of houses at the present time was less acute than it was a year or two ago. That was probably due to what might be regarded as the normal fluctuation in demand. Although the Government scheme had proved so costly it must have involved an enormous amount of the most arduous work by the Government and municipal officers who had been responsible for the operations, and he thought they ought to pay a tribute of praise to them for their efforts. It had been a costly business, but he believed they would reap a very great and lasting benefit from it as a result of the manner in which public attention has been directed to housing needs, and from the volume of intensive thought that had been given to the general improvement of housing throughout the country.

Referring to the possible agencies for bringing accommodation up to date, Mr. Cook said they could not look to the Government for any direct assistance in the way of building unless it be through the erection of houses for their own employees. Would it not be of advantage if the Government set the example by instituting the provision of housing accommodation for their own employees? Local Governing bodies formed the next agency for consideration. Those authorities had provided by far the larger number of houses which had been built under public auspices and there was a very considerable volume of opinion in favour of wide extensions of their activities in that direction. There were three difficulties which had to be faced in considering that method of provision. The first was the question of finance. The second difficulty was in the cost of construction. The general experience was that the cost of construction when undertaken by public authorities was greater than when undertaken by private enterprise. The third difficulty was the cost of management. The third agency he would ask them to consider was employers, and it was probable that pressure of circumstances would compel employers in many instances to adopt that course. The Minister of Health in his recent speech referred to the instance of South Wales, and suggested that colliery proprietors might provide housing accommodation for their workers. That no doubt was a very excellent method, but the one drawback was that it tended to lessen the sense of independence of the worker and certainly did not tend to promote self-reliance.

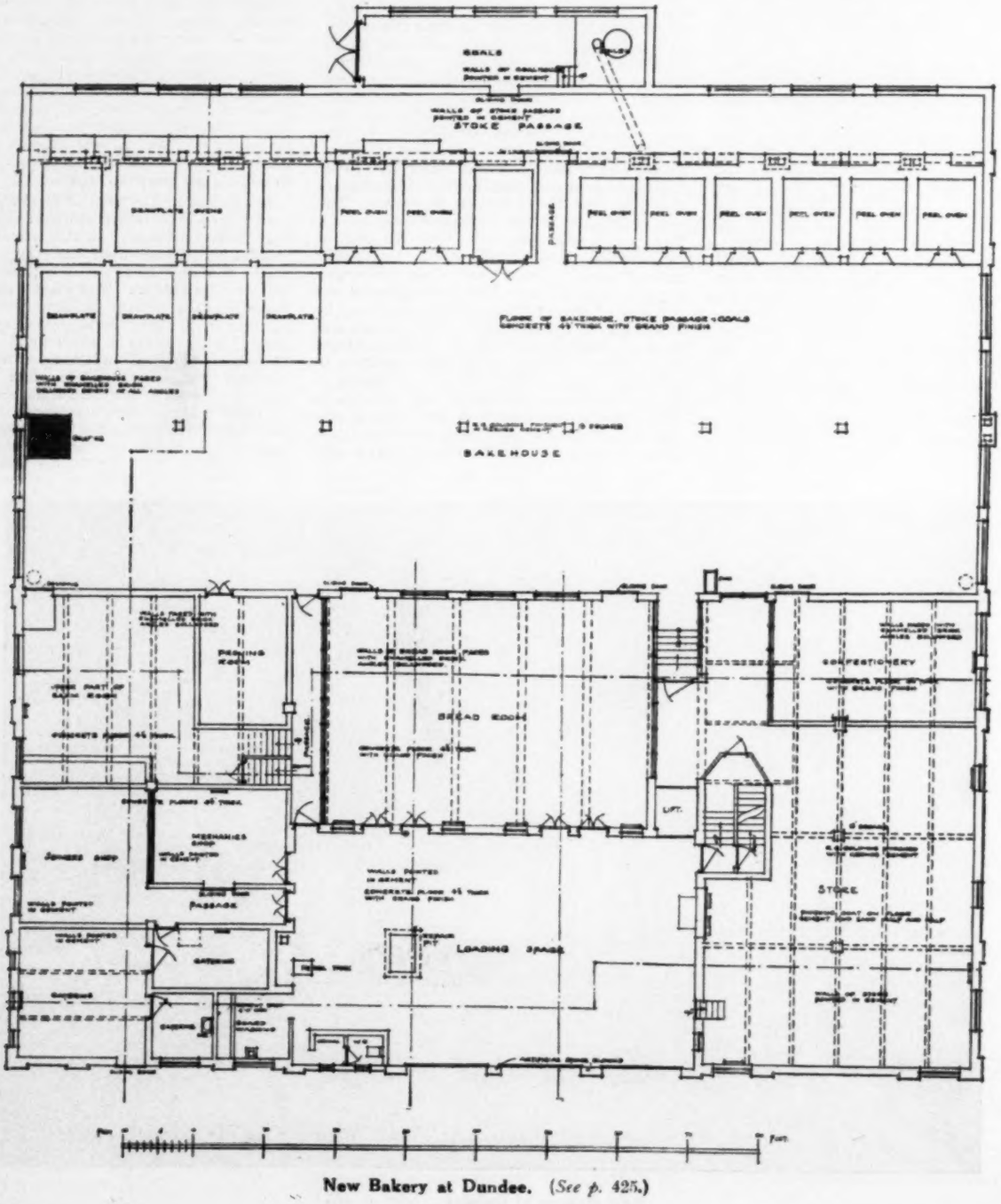
Fourthly there was the agency of public companies working on a purely commercial basis. This method if adopted on any considerable scale involved the issue of share capital for public subscription. The opinion among experienced people was that the operation of the Rent Restriction Act had completely destroyed any chance of obtaining capital from the general public by property owning companies and that that source must be ruled out of their consideration. The fifth possible agency was the Public Utility Society. The only disadvantage he could see in that agency was that the operations of those societies were so limited, and it could not reasonably be expected that they would fill their want to a material extent. Another agency which had come into being during recent years was the Co-partnership Tenants Association, a special form of Public Utility Society. The sixth agency was the provision of houses through philanthropic institutions and private benevolence. The only possible remaining agency, as far as he was aware, was private enterprise which was now looked to as the chief agency to solve their problem.

In considering the possible methods of building by private enterprise it would help them to take them separately. In the first place there was the person who built for his own occupation. That was the best possible method under suitable conditions. The best method of fostering such private building would be an increase in the practice of preparing standard plans, the elevations of which could be varied to prevent too great uniformity of appearance. Another method of which he had had some experience was the provision of houses by means of building clubs which was largely adopted in the South Wales Coalfield. The club would usually include two or three persons of some

New Bakery at Dundee. (*See p.* 425.)

means who would each take a share, and undertake to guarantee bankers' advances for the purpose of financing the building, and subsequently arrange permanent mortgages. Each member would pay a subscription of perhaps 10s. per month and when the houses were completed they were allotted among the members by ballot. The members might occupy them or let them as desired. If they occupied them they paid the normal rent in addition to their subscription, and, if let, the rent would go to the funds of the club towards the reduction of the advances until they were wiped out, and the club then would come to an end. That had proved a very popular and beneficial means for the provision of housing accommodation where there had been no other method available. It might with very great advantage have very wide extension. The third method which could be adopted by private enterprise was the direct building of houses by individuals as a permanent investment. The remaining method brought them to the immediate subject for their consideration, "speculative" building. He urged that at the present moment speculative builders were not so much in need of such special facilities as for well-informed guidance by a central authority and the removal of strangling restrictions. The mass of speculative building in the country had been carried out by a very large number of small builders, who, however, were not strongly organised. There had, of course, always existed builders who had built on a large scale, but he was convinced that they would have to look for a solution of the problem to the work of the large number of small men, and preferably to the man who worked with his men. In his experience that was the most economical method of providing houses. It was the same method as was adopted by the working farmer. The fundamental cause of the success of that method was that the master was earning full wages himself and his example inevitably inspired better work by his employees. Another advantage was that actual work on the job developed in the builder what was called in the agricultural world "horse sense," which was of the utmost value in connection with his calling.

If a builder was prepared to work on his job and confine his operations strictly within his means, he knew of no calling, other than farming, which would better enable him to remain independent and develop finer qualities of character. It was a "man's job," for it required self-reliance, courage, determination, industry, and sagacity, all in a high degree, and, what mattered most, it encouraged friendliness between master and man. There was every reason why they should endeavour to extend the numbers of that class by assisting building workmen (preferably in partnership) to join it. Strength of character, however, was the vital qualification. It was of the first importance at the present time that the status of the independent builder, as distinguished from the contracting builder, should be raised. He must remain independent, but some means should be taken to recognise and approve his good work. In the past he had been



New Bakery at Dundee. (*See p.* 425.)

his own architect which in practice meant imitation. That fact had been the cause of the monotonous streets of houses that existed in all urban districts. The builder would see a type of house that took his fancy and repeat it. The qualities that went to make a good builder were not usually found in combination with the artistic instinct. There was that vital difference between the independent and contracting builders. The contracting builder was under the control of the architect, whereas the architect (when employed) was under the control of the independent builder. He would urge upon their attention the desirability of promoting the closest co-operation of the architect with the independent builder. When travelling through the country one's eyes were now and then delighted with the sight of a house of beautiful design. It might be a cottage only, but a cottage might be a thing of beauty. Why should not all of their dwelling houses be things of beauty? They needed to search among architects for those who were gifted with the artistic instinct, and enlist them in the service of beauty. If they were to raise the standard of beauty in the architecture of the smaller houses in any great degree it would be necessary to secure co-operative work among architects, so as to relieve those members of the profession who did possess artistic ability from work in other departments, and allow them to devote the whole of their energies to design. In providing the smaller houses at a reasonable cost it would not, of course, be practicable to pay the usual architectural fees on the full value, but he could see no reason why beautifully designed and well planned houses should not be repeated in large numbers with sufficient variation of elevations, in the way of colour and emphasis, to avoid monotony. He thought the public of the country had to face the fact that in future newly built dwelling houses of an improved type would not be available for renting in any large numbers. He had a very strong preference for the system of occupying ownership. It admittedly fostered stability in the national character. That fact was its best justification. It could most surely be promoted by the production of soundly built, well planned, and beautiful houses.

They must eliminate jerry building. In the course of further remarks, Mr. Cook urged that the vital fact to remember was that the large majority of independent builders could not continue operations unless they succeeded in selling the houses built by them. Referring to the financial side of the question, Mr. Cook said there were not many builders who made a practice of never commencing a house until they had sufficient money in hand to finish it. The majority of them had to obtain advances during the course of erection.

NEW BAKERY AT DUNDEE.

THE new bakery at Dundee (illustrated on pp. 423 and 424) has been built in Lytton-street for Messrs. Andrew G. Kidd, Ltd. The architects are Messrs. Thoms & Wilkie, FF.R.I.B.A.

The bakehouse proper has a clear floor space extending to 135 ft. by 46 ft. To the south is a series of twelve ovens, all fired from the back by a stoke passage, behind which are situated the boiler house and fuel store. Over the ovens, the external wall and bakehouse roof beams are carried by a continuous 30 in. by 14 in. beam supported on 14 in. by 14 in. columns, no load being taken by the oven walls themselves. The bakehouse roof has been designed for a safe load of 200 lbs. per ft. super. to make it possible to use it as a future floor when additional floor space is required. To the north of the bakehouse the central portion is occupied by a large packing room. The large glass-roofed loading space is equipped with a petrol tank and pump, and with facilities for washing, cleaning, and repairing the motors. To the west of the bread room and loading space there are stores on basement and ground floors. Above these is a suite of offices with rest room and lavatories for the women employees. To the east is the catering department. There are also joiners' and mechanics' shops, with a large cellar, and the men's rest room, dressing-room and lavatories. The major portion of the upper floor is used as a flour store, where thousands of bags of flour are piled on a 5½ in. slab carried by 32 in. by 12 in. beams of 32 ft. clear span. Opening from this flour loft, on part of the present bakehouse roof is a loft containing flour shoots to the machines below, and to the baking tables. An electric lift in the corner of the loading space serves the various floors. The interior is almost entirely faced with white enamelled bricks.

The buildings, covering an area of 138 ft. 11 in. by 137 ft. 1 in., excluding the fuel store and boiler house, are constructed in brickwork, and the whole of the columns, floors and roofs are of reinforced concrete on the Kahn system. The contract for reinforced concrete work was carried out by Messrs. Clark & Chapman, Aberdeen.

PREMIUMS AND THE RENT ACT.

AN article appeared in *The Times*, August 17, calling attention once again to the system of charging premiums on letting houses in spite of the Rent Restriction Act. At the conclusion of that article it is stated that no doubt much of the evil is the result of sub-letting and that it would be to the advantage of everyone if a subtenant could be found strong-minded enough to test the legality of the whole system; "until that is done, and so long as the demand for houses is greater then the supply, the premium will continue to flourish."

The subtenant may have been deterred by the decision of the Court of Appeal in Remmington *v.* Larchin (1921, 3 K.B. 404) which we referred to in our issues of June 24 and November 25, 1921. In that case, a tenant being desirous of giving up his lease obtained the consent of his landlord to his doing so if he could find a suitable tenant in his place. The tenant found another to take his place, and the landlord accepted him, but the tenant had without the knowledge of the landlord accepted a premium from the tenant who was to take his place. The Court of Appeal held that section 8 of the Act did not apply, and the incoming tenant could not recover the premium paid to the tenant who had accepted it from him.

The case is peculiar because the tenant in possession did not himself sublet the flat, but only found a tenant who was accepted by the landlord. In these circumstances he was not a "landlord" within the meaning of the Act, but was treated by the Court as a "stranger," and the section (although in the Act of 1920 the word "person" was used for the first time in place of the word "landlord" in former Acts) was held only to apply as between landlord and tenant. It would appear that although this decision did not apply to the ordinary case of a subtenant demanding a premium, this fact may well not have been appreciated and subtenants may have thought that it applied to their case.

However this may be, the premium is demanded openly and almost universally, as a study of the advertisement pages of any newspaper will show. It is hardly surprising, for few people desiring a house and agreeing, in order to secure it, to pay a premium, would feel it honourable, having secured the house, to set up the Rent Act against the landlord; such a proceeding would savour of accepting a loan and then setting up the Statute of Limitations when repayment was asked, a course, though legal, that is never commendable.

Similarly no private individual would institute a prosecution under the Act and for the same reasons; although one prosecution of an agent has been reported, as we have pointed out on former occasions, the construction now placed upon the word "person" by the Court of Appeal makes it very difficult (on the very short report of that prosecution) to know whether the Act now applies to such cases.

The abolition of this most vexatious and complicated legislation or its restriction to the very small class of house originally brought within it would, we venture to say, be of great advantage to all concerned with house property.

RENT RESTRICTION.

IN *The Times* of August 23 it was stated that the Mayor of Worcester had forwarded to the Committee appointed to consider the Rent Act a suggestion that the present increase of the standard rent by fixed percentages does not operate satisfactorily, and that the question of the rent to be charged after June 24, 1923, should be fixed by some tribunal, and the tribunal suggested is the overseers.

In *The Times* the Committee is described as "The Government Committee appointed to consider the amendment or extension of the Rent Act," but the terms of reference to the Committee were "To consider the operation of the Increase of Rent Act and to advise what steps should be taken to continue or amend that Act." As the Act, unless extended, will expire on June 24, 1923, we presume by the terms of reference the Committee can consider whether the Act should be continued at all after the date fixed for its expiration, and it is open to the Committee to recommend that it should be allowed to lapse. At the time rent restriction was first introduced we did suggest the setting up of rent courts to deal with the properties of very low rental during the war, and we still think such a measure would have been preferable to the very complicated Rent Acts which have been steadily extended ever since 1915.

But the present Rent Act embraces properties of very high value, and to introduce the system advocated by the Mayor of Worcester to the properties at present within the Act would, we consider, be most objectionable. Rent restriction has passed the bounds of all reason, as it extends to the class of property dealt with by persons well able to protect their own interests, as they have always done in pre-war days, and we have continually urged that this restrictive legislation, with its accompaniment of unrestricted litigation, has favoured one small class—the sitting tenants—but has tended to increase the scarcity of accommodation and the prices charged for house property as a whole. We contend that the time has come when a free market in house property would tend to lower both rents and prices.

If cases of what may be called "sweating" in low-valued houses, resulting from the war, can be proved before the Committee, a case might be made for some continued check upon it, but to apply the suggestion now made that the overseers should fix the rents of all houses as at present within the Act is, in our opinion, quite absurd and would tend to continue the reluctance bred by the Rent Restriction Act to own house property and quite extinguish the letting of property on lease. The decision of the overseers on such a point could not be allowed to be final, and the same complications would arise as are connected with rate assessment. Bureaucratic management of and legislative interference with private property discourage all enterprise.

The Director-General of Housing, according to *The Times* of August 24, has recently drawn attention to the continuing fall in the cost of building, and it is possible a time may be approaching when the provisions of the Rent Act may actually conduce to keep rents of older houses from falling. As it is, it prevents houses of the higher values from being offered to be let on lease, whilst it affords no check at all to the prices asked on sale. Rents, now the war is over, should be settled as between the parties directly concerned, as is the price of every other commodity now war restrictions are removed, and not by any tribunal or overseers or anyone else. The only way in which housing problems can be settled is by re-establishing free trade in houses and abolishing all restrictions which were alone justified and rendered necessary by the war.

THE FIRE RESISTANCE OF CONCRETE.

THE following is an abstract of a paper prepared jointly by Professor F. C. Lea, O.B.E., D.Sc., M.Inst.C.E., M.I.Mech.E., and Mr. R. E. Stradling, Ph.D., M.Sc., Assoc.M.Inst.C.E., and read before the recent meeting of the British Association at Hull :—

In considering the effect of fire upon reinforced concrete the problem can be stated under two headings :—

(1) Is it possible to make concrete which shall retain its strength during and after exposure to the high temperatures liable to occur in a building fire ?

(2) Is it possible to prevent the steel from reaching such a temperature that its strength is reduced to, or below, that required to carry the loads occurring in the building ?

In the paper presented to the Association in 1920 and in other published papers, one of the authors has shown that mild steel at temperatures of little more than 600 deg. C. has a very low breaking stress, and that assuming the concrete itself conducts heat sufficiently to allow the temperature of the steel to rise to more than 600 deg. C. a loaded structure is almost bound to fail. Certain data were also given as to the conducting power of concrete, and it was there shown that when the surface of concrete is exposed to certain temperatures for periods of from one to four hours the temperature of steel at given distances from the heated surface reached the dangerous temperature, and subsequent tests which will be published elsewhere have confirmed the results obtained. It was also shown that the concrete itself was very seriously affected by exposure to temperature, and it was then suggested that investigations were desirable to determine the causes of failure of the concrete so that the direction in which trials should be made to determine a fireproof concrete, if such is possible, might be indicated.

The details given below are chiefly in connection with the former of these divisions, though, as will be seen later, this leads quite naturally to a consideration of the latter.

The mode of failure of concrete may be as follows :—

(1) The concrete can be considered to consist of a network of cement holding together stones of various sizes ; if the finer aggregation of mortar is caused to fail the whole mass will be disintegrated quite independently of any effect the coarse aggregate may have.

(2) In such a network structure if all the stones are covered with cement no increase in total volume can take place unless the cement itself expands. When expansion takes place the stresses will be produced in the coating cement and in the aggregate, unless the expansion of the cement is exactly equal to that of the aggregate. These stresses may be sufficient to cause cracking of the cement or, when cooling takes place, may lead to separation between adjacent boundaries.

It should be remembered that as concrete is porous and a large proportion of the cavities are adjacent to the particles of aggregate, considerable expansion of such particles might take place into the cavities without seriously affecting the surrounding cement. In order to arrive at some idea of the mechanism of failure, the work in the preliminary investigation was simplified by examining the effect of high temperatures on mortars of various descriptions.

The Effect of High Temperatures on Mortars.

It is of great value in attacking this problem to consider first the purely hypothetical case of a spherical sand grain completely surrounded by a cement envelope in close contact with it. This contact might be broken in two ways when the system is exposed to a rise in temperature :—

(1) A relative movement between the sand grains and the cement due to differences in their coefficients of expansion might cause either the sand grains, if the coefficient of expansion of sand was less than that of the cement, to leave their cement casing, or, if the coefficient was greater than that of the cement, the sand might expand and burst through the cement.

(2) The cement itself may break down under the effect of heat caused by some innate property of the cement, which would take place whether the sand were present or not.

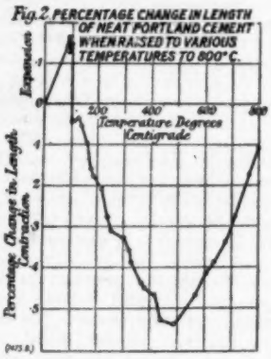
In general, then, if (2) were the cause of failure, the breaking down would happen whatever material was mixed with cement to make a mortar (*e.g.*, powdered brick instead of sand), but, on the other hand, if (1) were the cause only, it should be possible to form a mortar which, by using a "sand" of the same coefficient of expansion as the cement, would not disintegrate with rise of temperature.

The following work suggests that concrete as at present made in practice primarily fails through causes found under heading (1), but that though this type of failure can be partially avoided by using rather different materials than usual, then failure occurs by the breaking down of the cement itself as suggested under (2).

The Effect of Heat on Hydrated and Hardened Portland Cement.

After a detailed consideration of the relative movements of cement and sand grains, the coefficient of expansion of cement, the relative proportions of cement and sand, the external pressure on the spherical envelope, and the elastic constants of cement and sand, the effect of heat on hydrated and hardened Portland cement was dealt with.

Fig. 2. PERCENTAGE CHANGE IN LENGTH OF NEAT PORTLAND CEMENT WHEN RAISED TO VARIOUS TEMPERATURES TO 800° C.



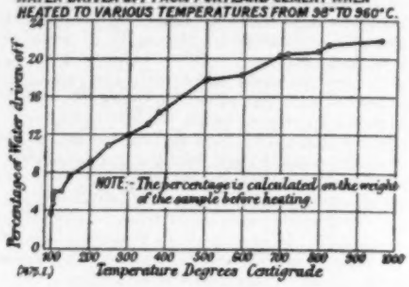
The effect of a rise in temperature of neat Portland cement cast in the form of a cylindrical rod, the paper continued, is to cause an expansion up to about 93 deg. C., but at 100 deg. C. and up to 491 deg. C. a continuous contraction. It was considered that useful information might be obtained by an attempt to measure the amount of water driven off from a set cement at various temperatures, and to ascertain if possible what relation, if any, existed between the length changes and the water given off. An apparatus was erected, the water and CO_2 being collected in absorption bulbs and weighed. Mr. F. J. Fraser, B.Sc., made a very considerable portion of the apparatus, and also gave valuable assistance in carrying out the experiments.

The samples actually used were from a torsion specimen, a small piece being taken and powdered up. About 1.5 grammes were actually used at a time in each apparatus. The sample was raised to a certain temperature, and held there for some period. The gain in the absorption bulb was then obtained. The sample was then kept at the same temperature for a further period, and again any change in the absorption bulbs noted. This process was repeated until at any particular temperature there was no appreciable gain in the absorption bulb. The temperature was then raised, and the process repeated and carried up to 960 deg. C. Plotting the results, the curves shown in Figs. 7 and 8 were obtained.

Fig. 7 shows the total percentage of water (calculated on the weight of the sample before heating) driven off up to any temperature between 98 deg. C. and 960 deg. C.

Fig. 8 shows the average percentages of water driven off per degree rise between certain temperatures. In other words, it is the "slope" of the curve given in Fig. 7. This curve shows in a most interesting way various critical periods in the heating of cement.

Fig. 7. CURVE SHOWING TOTAL AMOUNT (PER CENT) OF WATER DRIVEN OFF FROM PORTLAND CEMENT WHEN HEATED TO VARIOUS TEMPERATURES FROM 98° TO 960° C.


Percentage of Water driven off
NOTE:—The percentage is calculated on the weight of the sample before heating
Temperature Degrees Centigrade

Up to 98 deg. C. the water driven off may be considered as that contained in the "free" state.

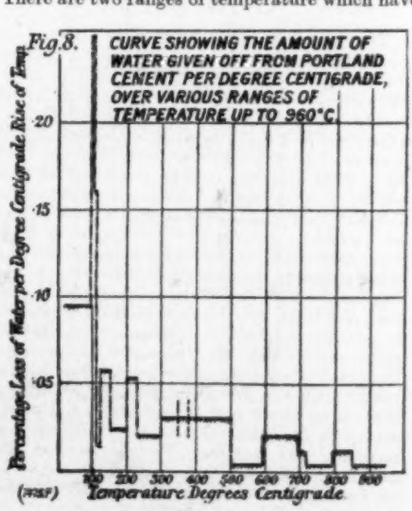
In Table II is given the abstract of experimental data from which the curve in Fig. 8 is plotted. In the second column is given the percentage loss of water during the range of temperature noted in the first column. The third column is obtained by dividing the figure in the second by the temperature range in the first, and hence is a kind of average "rate" of loss of water per degree rise. It is the figures in this column which are plotted against the temperature range in Fig. 8.

TABLE II.

Temperature Range, Deg. C.	Gain in Water Absorption Bulbs, Per Cent.	Percentage Loss in H_2O Deg. C. Rise.	Remarks.
Up to 98	7·56	0·095	Only very approximate.
98 to 102	1·00	0·25	Carried out in low temperature apparatus.
102 to 110	1·30	0·16	
110 to 120	0·15	0·015	
120 to 150	1·7	0·057	
150 to 200	1·2	0·024	
200 to 230	1·6	0·053	
230 to 250	0·4	0·020	
250 to 300	1·0	0·020	
300 to 350	1·5	0·030	
380 to 500	3·6	0·030	Carried out in high temperature apparatus.
500 to 595	0·37	0·0039	
595 to 695	2·03	0·020	
695 to 714	0·20	0·0105	
714 to 796	0·30	0·0035	
796 to 848	0·60	0·0115	
848 to 960	0·40	0·00357	

The curves from Table II are extremely interesting, and give quite useful suggestions. There are two ranges of temperature which have

Fig. 8. CURVE SHOWING THE AMOUNT OF WATER GIVEN OFF FROM PORTLAND CEMENT PER DEGREE CENTIGRADE, OVER VARIOUS RANGES OF TEMPERATURE UP TO 960° C.



somewhat abnormal characteristics. The first is 200 deg. to 230 deg. As far as it was possible to tell visually (by watching condensation), there was quite a sudden rush of water about 230 deg. C.

Between 300 deg. and 500 deg. C. there appears to be a rather different type of change. The amount of water driven off per degree rise seemed to be a fairly constant quantity throughout the range. It was in this range that the break occurred between the results obtained in the two sets of apparatus. The last range obtained in the lower temperature apparatus was 300 deg. to 350 deg. C., and the first one obtained in the higher temperature apparatus was 380 deg. to 500 deg. C. Thus a gap between the results of 30 deg. C. exists. It was rather extraordinary that the calculated amounts of water given off per degree rise in the two cases were the same within the limit of less than ½ per cent. Hence the curve has been assumed continuous, but the actual gap is marked by two short vertical lines at 350 deg. and 380 deg. C. in Fig. 8.

It is not suggested that this curve (Fig. 8) shows exactly the definite change points either in exact position or the relative magnitudes. Obviously the actual temperatures between which measurements were taken must very greatly affect the exact shape of the curve.

It is considered, however, that the following deductions are legitimate, and quite justified by these experiments, and are in harmony with the results of the other experiments.

(1) There are definite ranges during which there are much greater amounts of water given off than at others.

(2) The greatest rate occurs between 98 deg. and 102 deg. C.

(3) As far as the present experiments are concerned, there is no range where a certain amount of water is not driven off by a rise in temperature of a few degrees, though in many cases the amount is extremely small.

(4) There appears to be a special range between 300 deg. and 500 deg. C. when water is driven off at a fairly constant rate, and the total amount appears to be about 30 per cent. of the total "combined" water (*i.e.*, water driven off above 98 deg. C.).

(5) After 500 deg. C. is passed, the amount of water given off in the manner described in (3) above is very much less than previous to 300 deg. C.

(6) Though scientifically this work requires repeating with greater care and shorter range of temperature, yet the results already obtained indicate with sufficient accuracy for practical purposes that there are certain ranges during which some definite hydrated Portland cement compounds undergo disassociation from the combined water.

In passing it is, perhaps, worth noting what the type of actions summarised in (1) and (3) above might indicate with regard to the chemical composition of hydrated Portland cement.

The action stated in (1) would suggest the presence of definite hydrates with a definite disassociation temperature, whilst the fact of (2) seems to show that water is also combined in some other way which allows a slow disassociation the whole time, and this might be caused by the presence of a colloidal compound.

There can be little doubt that the contraction obtained in the experiments described previously, as designed to ascertain the value of the coefficient of expansion, is due to this disassociation of water from the hydrated cement.

Both sets of experiments agree in showing that the greatest rate of change occurs at about 100 deg. C. Further, both also show that there is no steady point, and that contraction is taking place the whole time when cement is heated above 100 deg. C. up to about 490 deg. C.

The agreement between the chemical data and the expansion is not quite so clear at temperatures beyond 491 deg. C. The reason for this was not obvious at once, but the following hypothesis which may be ventured is supported by a good deal of experimental evidence. In the microscopic examination of cements the one point which is quite definite, and which has been noted by other workers as well, is that it is not possible to hydrate completely any commercial sample of Portland cement; in fact, in many cases, even after every effort has been made, under laboratory conditions, to cause complete hydration, yet about 30 per cent. remains unreached by water.

By further examination of the harder portions, it can be shown that they are unchanged particles of Portland cement clinker, that is, grains which have never been hydrated by the mixing of the cement.

To apply this to the consideration of the effect of heat on neat Portland cement it is only necessary to realise that we are really dealing again with another mortar and not a homogeneous cement.

We have, really, hydrated cement surrounding particles of inert and unchanged clinker, the presence of which is partially due to the coarseness of grinding. It should be realised, however, that these relatively large particles would practically all pass the 180 by 80 standard sieve!

What is likely to occur? When heated there is no doubt that the hydrated portions lose water and contract; this is shown by both the expansion and the chemical tests. On the other hand, is there any reason to assume that the unhydrated and unchanged (since leaving a kiln in which the temperature is 1,300 deg. C.—1,500 deg. C.) particles contract? It is far more probable that they expand.

It is suggested that the most probable cause of the cracking of hydrated cement is just due to this breaking down of a "mortar." With the comparatively close contact between the hydrated cement and the unhydrated (due to the hydration of a surface layer on these fragments which prevents further penetration of water) the breaking down will commence practically as soon as any contraction takes place, that is, at 100 deg. C. This is exactly what is found by experiment. As the temperature rises more expansion of the unhydrated fragments will take place causing more hydrated cement to break down. This action will continue until all the unchanged clinker is free to move and expand when the specimen on further heating may expand or contract, depending upon the relative movements of the hydrated and unhydrated portions. This last statement is not quite true as it stands, as probably some of the products of hydration have lost all their water by this time, and are helping the expansion rather than the contraction. It is worth suggesting whether this is not due, in the particular case shown in Fig. 2, to the finishing of the dehydration of the calcium hydrate. The curve in Fig. 2 would seem to point to some such action as that outlined above. There is a very marked change point at 491 deg. C. where the movement of the specimen changes quite suddenly from a contraction to an expansion. It would seem likely that at this point (in this particular sample) the hydrated cement is now quite shattered and the expansion now very much exceeds any further contraction taking place during the various ranges up to 491 deg. C.

A further note on the 300 deg. C.—491 deg. C. range is important. The fact is well known that one of the chief products of the hydration of Portland cement is calcium hydrate ($Ca(OH)_2$). This compound is broken up at about 400 deg. C. into calcium oxide (quicklime) and water. It is suggested that the comparatively great loss between 300 deg. C. and 500 deg. C. is due to the breaking up of this compound. It will be necessary later to discuss the ultimate effect of this in more detail.

Causes of Failure of Portland Cement Mortar and some Probable Critical Points.

Summarising now the data and previous discussions, the writers would suggest the consideration of Table III as a short statement of the various factors which effect the failure of cement-sand (quartz) mortars or concretes:—

TABLE III.

Temperature Range.	Effect of Heat.		Remarks.
	On Cement.	On Sand (Quartz).	
deg. C. 0 to 98	Expands at about same rate as steel, but probably increases in strength	Expands, but relative expansion not yet sufficient to cause failure	
At 100 deg.	Begins to contract, and if held at this temperature the total contraction is greater than the previous expansion	Probably remains constant	This point is sufficient to cause failure if sand particles were completely covered and isolated.
100 to 300	Still contracting, the total at 300 deg. being about 2¼ times as much as expansion up to 100 deg. C.	Still expanding	If failure has not occurred at 100 deg. C. the mortar usually starts to fall during this range.
300 to 491	Still contracting. The $Ca(OH)_2$ probably disintegrates during this range	Still expanding	Serious failure usually starts in this range.
491	Apparent change point. Commences to expand. (Dehydration of $Ca(OH)_2$ complete?)		
491 to 575	Still expanding	Still expanding	
At 575	——	Change of α quartz to β quartz with linear expansion of about 0·4 per cent.	This usually completes the failure if not already completed.

Now to return to the case of sand-cement mortars and the experimental values obtained.

With the outline given in Table III in mind, we can, perhaps, analyse the actions taking place.

Experimental Data showing Reduction in Strength of Sand-Cement Mortars and Concrete.

Three sets of mortars were made up, their compositions (by weight) being as follows:—

1 part cement, 1 part Leighton Buzzard sand.
1 part „ 2 parts „ „ „
1 part „ 3 parts „ „ „

These were made into standard tension briquettes and tested when 28 days old. The specimens were made up, stored in water for 28 days, and then heated either in a hot air oven or electric resistance furnace (depending on temperature required) until they had remained at the required temperature for at least two or three hours. The total time in the furnace was usually about 8 or 9 hours. The briquettes were then allowed to cool in the furnace and tested for strength as soon as they were cold enough to handle.

The results are given in Tables IV, V and VI. Each temperature-strength is an average of three briquettes.

The examination of the curves brings out very clearly the increase in strength

due to the "drying out" of the cement just below 100 deg. C. The amount of this increase is probably not a definite quantity, but depends very largely on the time of exposure at the temperature. This increase in strength, shown in two of the curves as existing for some considerable increase in temperature, could probably be completely nullified by holding the specimens at 100 deg. or just over for a sufficiently long time (though this time is not of practical consideration, as it would quite likely be in the neighbourhood of some months).

Considering each curve in detail, it will be seen that in the case of 1 : 1 mortar the strength

TABLE IV.

1 : 1 (one part cement, one part Leighton Buzzard sand, 12·67 per cent. water).

Temperature.	Percentage. Loss in Strength.
deg. C.	
97	— 22·3 (Gain)
106	— 16·3 ,,
200	— 16·9 ,,
360	— 13·4 ,,
510	+ 12·7 (Loss)
550	+ 29·9 ,,
625	+ 64·9 ,,
700	+ 71·6 ,,
750	+ 72·2 ,,
775	+ 90·7 ,,
790	+ 89·6 ,,
850	+ 91·1 ,,

TABLE V.

1 : 2 (one part cement, two parts Leighton Buzzard sand, 9·5 per cent. water).

Temperature.	Percentage. Loss in Strength.
deg. C.	
97	— 26·5 (Gain)
130	— 20·4 ,,
180	— 19·8 ,,
250	— 3·12 ,,
280	— 3·59 ,,
425	+ 12·6 (Loss)
463	+ 17·3 ,,
509	+ 41·4 ,,
530	+ 65·7 ,,
625	+ 82·4 ,,
700	+ 84·3 ,,
750	+ 82·5 ,,
775	+ 90·9 ,,
775	+ 91·8 ,,
850	+ 92·8 ,,

TABLE VI.

1 : 3 (one part cement, three parts Leighton Buzzard sand, 8 per cent. water).

Temperature.	Percentage. Loss in Strength.
deg. C.	
97	— 16·8 (Gain)
130	+ 2·4 (Loss)
194	+ 11·3 ,,
250	+ 14·2 ,,
280	+ 24·3 ,,
425	+ 27·9 ,,
509	+ 47·1 ,,
530	+ 65·7 ,,
620	+ 83·8 ,,
775	+ 90·5 ,,

is increased by over 20 per cent. when heated to 97 deg. C.; with further rise in temperature the strength gradually decreases, starting to fall away rapidly in the 400 deg. to 500 deg. range. The effect of the quartz $\alpha - \beta$ transformation is also quite distinctly marked by the nearly vertical slope of the curve at this point. A similar action is seen in the 1 : 2 mortar, except that the fall off in strength occurs earlier, commencing about 200 deg. C. The $\alpha - \beta$ quartz point is well marked. With the 1 : 3 mortar, the failure occurs at or just above 100 deg. C., and the decrease is very rapid. In all cases the loss in tensile strength has dropped 75 per cent. of the strength unheated by the time 500 deg. to 700 deg. C. has been reached.

The actual loss in strength of 1 : 2 : 4 Portland cement concrete (by volume) when raised to 700 deg. to 800 deg. C. has been checked on many occasions, and varies from 60 per cent. to 80 per cent. With the $\alpha - \beta$ quartz point in mind, the obvious step was the making and testing of concretes and containing quartz in any appreciable quantity. Such material for aggregate seemed possibly to be available from the following sources:—

(1) Burnt clay products, *e.g.*, bricks, &c.

(2) Natural rocks, *e.g.*, basalts, dolerites, &c.

Before making large numbers of concrete cubes, &c., such as are entailed in a strength-temperature investigation, some tension briquettes were made up. The proportions are stated below, and are those which would give the equivalent volumetrically of a 1 to 3 (by weight) cement-sand mortar. The two materials used were (1) red brick, of semi-vitrified type, a first-class red facing brick (actually the type used for this purpose at the Edgbaston buildings of the University of Birmingham); (2) fire brick, average commercial article used for lining furnace flues, &c. The values are as under:—

TABLE VII.

1 part cement, 2·5 parts red brick (by weight), 10·3 per cent. water, age 2 months.

Temperature.	Strength.	Loss. per cent.
Unheated ..	546	—
530 deg. C. ..	537	— 2·0 (Gain)
620 deg. C. ..	420	23·0

TABLE VIII.

(1 part cement, 2 parts fire brick (by weight), 15·7 per cent. water, age 2 months.)

Temperature.	Strength.	Loss. per cent.
Unheated ..	500	
530 deg. ..	390	22·3
620 deg. ..	318	36·4

In these cases we see that there is still a fairly marked effect between 500 deg. and 600 deg. C., though not as marked as in the case of sand mortars.

Thin micro sections were then made of these bricks, which soon showed quartz present. The relative strengths of (1) quartz sand mortar, (2) red brick mortar, (3) fire brick mortar, after exposure to a fairly high temperature can be realised from Table IX where the strength of each after exposure to 620 deg. C. is given.

TABLE IX.

Mortar.	Loss in Strength after Exposure to 620 Deg. C.
	per cent.
1/3 cement—Leighton Buzzard sand	80
Equivalent cement—red brick ..	23
Equivalent cement—firebrick ..	36

Although it was realised the exact figures thus obtained did not give absolute values for concrete, yet it was considered sufficient to justify spending time in making up concretes of corresponding compositions.

Supplies of broken brick and scrap fire brick were obtained and broken to the following grades:—

(1) Large aggregate, to pass $\frac{1}{2}$-in. mesh, and retained on $\frac{1}{4}$-in. mesh.

(2) Fine aggregate, to pass $\frac{1}{4}$-in. mesh, and retained on 80 × 80 sieve.

Concretes were then made up of 1 part cement, 2 parts fine aggregate, 4 parts large aggregate by volume, and cast into 4-in. cubes. When 28 days' old these were raised to various temperatures, and held there for two to three hours. The results are given in Tables X and XI.

The data collected has been plotted, and it is seen that both red brick and fire brick concrete are very superior to that made with ordinary quartz sand as a fire aggregate. The $\alpha - \beta$ transformation of quartz appears to be the final cause of failure with sand as a fine aggregate. The quantity of quartz present in the building brick and the fire brick does not seem to have any serious effect.

One other source of material for aggregate was also tried. A local dolerite (Rowley Rag) was used to form both tension briquettes and concrete. The experimental data for the tension briquettes are given in Table XII. The compression cubes have not yet been completed at the time of writing.

The general results given appear to indicate that Rowley Rag used for fine and coarse aggregate will make a more fire resistant concrete than quartz sand, but probably not quite so resistant as broken brick.

General Conclusions from Preceding Experiments.

It would appear from the experimental work already outlined that it is possible to make a concrete which retains sufficient strength at high temperatures to carry the full loads imposed by ordinary design methods, provided the temperatures concerned are not above about 900 deg. to 1,000 deg. C., average values to be reached in building fires. But such an assumption is only valid for the condition imposed upon the concrete during the experiments.

The experimental conditions which differed from practical ones are mainly two:—

(1) Concrete only was used in the experiments, and was not associated with steel, as is usual in most building work now.

(2) The strength was measured within a few hours of the cooling of the specimens which were allowed to cool in the furnace.

It is just these two further considerations which are of supreme importance in reinforced concrete work, considered as a fire-resisting material, and it is necessary now to examine these in more detail.

Effect of Rise of Temperature on Reinforced Concrete.

It has been pointed out earlier in this paper that if concrete is raised above 100 deg. C., then contraction is practically obliged to occur. On the other hand, steel embedded in the concrete still continues to expand as the temperature rises.

It is not difficult to realise what must happen. The adhesion between the steel and concrete must break down either by a complete sliding of the steel through the concrete, or the concrete must crack and thus leave the steel in this way. In practice it is this latter which occurs. One has only to read the descriptions of the behaviour of reinforced concrete buildings during fires.

TABLE X.

(Red brick concrete, 1 : 2 : 4, by volume (strength, unheated, 3,500 lbs. per in.²) at 28 days.)

Temperature.	Percentage. Loss in Strength.
deg. C.	
Unheated	—
200	— 11·5 (Gain)
300	— 18·85 ,,
400	— 12·45 ,,
500	— 16·60 ,,
550	— 5·43 ,,
600	— 6·38 ,,
650	0·19 (Loss)
700	2·11 ,,
800	11·05 ,,
900	35·40 ,,
1,030	55·30 ,,

TABLE XI.

(Fire brick concrete, 1 : 2 : 4, by volume (strength, unheated, 2,800 lbs. in.²) at 28 days.)

Temperature.	Percentage Loss in Strength.
deg. C.	
Unheated	—
200	— 19·4 (Gain)
300	— 21·2 ,,
400	— 20·4 ,,
500	— 10·7 ,,
550	— 5·1 ,,
670	19·6 (Loss)
700	7·0 ,,
770	9·26 ,,
800	27·3 ,,
915	32·8 ,,

TABLE XII.

(1 part cement, 1 part Rowley Rag, by weight. Tension briquettes.

Temperature. deg. C.	Percentage Loss in Strength.
Unheated	—
154	— 8·3 (Gain)
255	0·44 (Loss)
355	2·37 ,,
492	14·8 ,,
684	40·0 ,,
696	36·0 ,,

(*e.g.*, the Red Books of the Fire Prevention Committee) to realise that this is the case. One of the points on which great emphasis is laid is the "spalling off" of the concrete from the steel reinforcement, exposing the latter to the direct action of the fire.

With the amount of cover of concrete ordinarily allowed in design it is somewhat doubtful whether the question of heat conductivity of the concrete is of primary importance. This spalling action will, in many cases, occur long before the temperature of the steel can have risen to the degree which is dangerous. One of the writers has had opportunities of observing tests of large size slabs under fire conditions, in which spalling nearly always, if not always, preceded failure. The structure will fall due to the steel being heated to a point at which its strength is seriously affected, but this will usually happen by direct contact with the fire, and not by the heat conducted by the concrete. If a concrete which will not spall can be discovered the conductivity will be the only, and not by any means such a serious, menace.

This action will be seen to be most serious at the under side of beams and the sides of columns. It might be possible to counteract this effect by increasing the cover, but without actual large scale experiments it is not possible to say. Probably a type of burnt clay cover separated from the concrete by an air space or slag wool packed layer might be a solution, but again full scale experiments are required. It can now be said that the small scale experiments have shown, as anticipated by one of the authors, that much money has been wasted in large scale experiments which were carried out in an empirical manner without any real knowledge of the fundamentals of the problem.

The After Effects of Fire on Concrete.

Attention has been drawn to the fact that the specimens used in the experiments were all tested for strength within a few hours of heating. By accident on one occasion a specimen was left for about a week before testing. It was found to have lost strength quite out of proportion to the amount of heating. On leaving a previously heated concrete block exposed to the ordinary laboratory atmosphere for some days, the following is noticed :—

Though on removal from the furnace no cracks are apparent on the surface, yet quite soon these appear and after some days longer the block may crumble to pieces. It has not been possible to get the temperature accurately, but a lower limit for the previous furnace heating is about 400 deg. C.

The explanation of this phenomenon can be found in the fact that one of the chief products of hydration of Portland cement (as previously stated) is calcium hydrate. This dissociates into quick lime and water at about 400 deg. C.

$$Ca(OH)_2 \rightleftarrows CaO + H_2O$$

It must be realised that this is accompanied (as already shown) by a contraction of the concrete. Concrete is porous and the air getting in will carry moisture with it. This moisture will hydrate the quick lime again and the product of hydration ($Ca(OH)_2$) occupies a considerably greater volume and hence causes the concrete to crack, split and ultimately to crumble. A definite example is given under.

A set of 4 in. cubes (about six months old), composed of 1 part cement, 2 parts sand (Leighton Buzzard) and 4 parts Rowley Rag, were heated to 700 deg. C. The strength unheated was about 3,000 lb. per sq. in. Specimens dropped in water immediately after heating flew to pieces. The strength immediately after cooling was about 900 lb. per sq. in. The specimens were stored in the hydraulic laboratory, and two days later the strength was above 780 lb. per sq. in. Six days after heating some had crumbled to pieces and could not be picked up, whilst two had an average strength of 535 lb. per sq. in. None of these blocks had any cracks on the surface immediately after cooling down.

The importance of this "after effect of fire" cannot be over-estimated. Even although it might be possible to make a concrete by using burnt clay products or dolerites, which will stand its full load at the time of the conflagration, yet when the question has to be faced as to whether the building is afterwards safe, and if not, how much of it should be demolished and rebuilt, the answer would appear to be not very encouraging.

In view of the very large number of buildings already erected in reinforced concrete, the problem cannot safely be left at this point, but in the opinion of the writers the next work should be done on full size specimens. The fundamental scientific principles on which an answer must depend have been outlined above, but the form of the answer for practical conditions of work depends upon one or two further factors which cannot satisfactorily be reproduced under laboratory conditions of the ordinary type.

If money is available for futher rather expensive work, very useful data could be obtained of primary importance to the community.

As far as the present results are concerned, it is submitted that reinforced concrete as at present carried out in practice is anything but fire resisting, and the temperature of primary importance is a comparatively low one, probably about 400 deg. C., this being the approximate temperature of the dissociation of calcium hydrate.

But as important a point as the resistance during fire is that of the after effects. It is suggested that extremely careful and very skilful examination of reinforced concrete structures after a fire is required, and it is highly probable that the original factor of safety can never be replaced in the building structure except by complete reconstruction.

NEW BUILDINGS IN LONDON.

FINCHLEY.—Messrs. G. B. Farrar & Co. are erecting a petrol filling station, similar to the one installed at Ealing, on a site in East Finchley-road, facing Creighton-avenue. The plans and steelwork for this scheme have also been prepared by Messrs. J. Parr Emett & Partners, but the design in this case provides for a central one-floor building of octagonal shape with a sweeping front approach and back exit. Similar treatment and materials are being employed here as at Ealing. The independent lock-up garage accommodation here, however, will only be sufficient for eight cars. It is understood that every effort has been made in the design, method of construction, and materials used to ensure that these petrol filling stations shall be fire, damp, and weather proof.

VICTORIA-STREET.—Messrs. W. J. Lyons, Ltd., are converting the premises, No. 164, Victoria-street, into a café. The plans were prepared and the work is being carried out by the firm.

ARGYLL-PLACE.—Messrs. Hudsons, Ltd., 169, Bow-road, E.3, carried out the demolition and excavation for Messrs. Libertys in Argyll-place, Kingley-street, and Little Marlborough-street. Messrs. Higgs & Hill have the rebuilding contract and the building is to be in the Tudor style.

NEW NORTH-ROAD. — Messrs. L. H. & R. Roberts, 144, Lower Clapton-road, E. 5, are carrying out building work in New North-road for Messrs. Dottridge Bros. The architect is Mr. E. J. Hindsley, Dalkeith Cottage, Fortis Green-road, East Finchley, N. 2. The following are the sub-contractors: Messrs. Homan & Rogers, steel; The Impervious Stone Co., artificial stone and granolithic; Messrs. Limmer & Trinidad Lake Asphalt Co., asphalt. Other sub-contracts are not yet settled.

HAYDEN-PARK.—A site has been acquired at Hayden park for the erection of a Baptist church and schools. We are informed by the Rev. R. H. Miller that it is impossible to say at present when building operations will be commenced.

WEST.—The new building at the corner of Mortimer-street and Great Titchfield-street, for the Samson Clark Publicity Service, is nearing completion. It is being erected by Messrs. Bovis, Ltd., under the direction of the architect, Mr. Courtenay Constantine, F.R.I.B.A. This building will contain seven floors, and the entire premises will be organised and equipped on modern and approved principles.

HAMMERSMITH.—The Academy Picture House in King-street has been enlarged by the addition of a balcony to accommodate 350 persons. The construction of this new tier has been designed to utilise the structure and the main girder which carried the gable wall at the end of the roof over the main hall now forms the front of the new tier, which is built in special cast cement blocks. The roof has been extended at a higher level towards King-street, and the biograph operating room built at the rear of the balcony on the external wall. The whole of the work has been carried out in accordance with the latest County Council regulations, and a distinctive feature will be the heating and ventilating system; this will afford 750 cubic feet of fresh air per hour per person, which will be forced into the theatre at any desired temperature, according to the conditions prevailing. The whole of the existing work has been redecorated to harmonise with the new work. The architect is Mr. F. Edward Jones, and the contractors were Messrs. Harry Offer, Ltd., of Hampton Wick, who have carried out the work in a very limited time. The heating and ventilating plant was installed by Messrs. Stitson White & Co., of 102, Victoria-street; the electrical installation by Messrs. E. C. Sparkes & Co., of 118-120, Wardour-street; and the steelwork by Messrs. Moreland, Haynes & Co., Ltd.

BRIXTON.—Messrs. Wood & Co. are carrying out a difficult building operation at the Bon Marché, Brixton. A roof weighing over one hundred tons is being raised bodily by bottle-jacks to make room for the construction of a new story. As the roof is raised the walls are built underneath. The operation has saved the cost of building a new roof

CRYSTAL PALACE.—Repairs to the tower, Crystal Palace, are being carried out by Messrs. Douglas Fox & Partners, Victoria-street, S.W. The tower was originally fitted with water tanks, which served to supply the fire hydrants in the building and the fountains in the grounds with water. The weight of water also acted as ballast to give the necessary stability to the tower against wind pressure. The tanks have deteriorated, and it is intended to fill them in with 500 tons of concrete and steel. This weight has to be raised 275 feet from the ground level, and for the purpose the Hoisting Appliance Co., of Hornsey-road, Holloway, N.7, have supplied one of their H.A.C. Lifts.

PALL MALL.—New premises are being erected by Messrs. Hall, Beddall & Co., on the old site of the Guards' Club and the existing Bank, Nos. 69 and 70, Pall Mall. The frontages to Pall Mall and facing Marlborough House are being executed in Portland stone by Messrs. F. J. Barnes, Ltd., and the steelwork by Messrs. Moreland, Haynes & Co.

WHITECHAPEL-ROAD.—Messrs. R. Woollaston & Co., Limehouse, E.3, are carrying out alterations at 108, Whitechapel-road, E. The work will approximately cost £2,500 and is executed for Mr. D. Taub, 32, Wentworth-street, Aldgate, E.1, to be used as a silk and woollen store. Steelwork has been supplied by the Aston Construction Co., Ltd., and ironwork by Clark, Hunt & Co., Ltd., Shoreditch.

OXFORD-STREET.—New cloak room accommodation for ladies is being promised at the Restaurant Frascati by Messrs. Hall, Beddall & Co., under the direction of Messrs. Collcutt & Hamp, architects. All the sub-contracts are arranged, the marble work being executed by Messrs. Walton, Gooddy & Cripps, Ltd., the fibrous plaster by the Plaster Decoration Co., and the sanitary fittings by Messrs. Dent & Hellyer, Ltd.

TOOTING.—A commencement has recently been made with an extensive programme of building operations on the Bell Estate, which lies on the north side of Upper Tooting-road, at the Broadway end. The first portion of the projected scheme comprises two blocks of shops with one floor above as living accommodation. The larger block will consist of fifteen shops with a total frontage of 260 ft. to the main road; the other block will comprise six shops with a frontage of 100 ft. over all. The average depth of the blocks will be about 70 ft. The general construction will consist of brickwork with steel girders, stanchions, &c., and flat asphalte roofs. The shops will probably have hardwood and metal fronts with pilasters of art metal tiles, forming a frontage of artistic design. The frontage of each block will be constructed with special sand-faced bricks. For the rear external walls, four-press flettons will be used, and wire-cut bricks for the internal walls. Mr. H. Hemmings, road sewer contractor, of 9, Nutfield-road, Thornton Heath, is carrying out the building work, and it is his own scheme. It is understood he has negotiated for a considerable portion of the land on this estate and that he proposes to erect about seven hundred houses complete with roads, sewers, &c., covering an area of about fifty acres. The whole of this building area is being laid out by Messrs. J. Bell, Gripper & E. H. Wilkins, surveyors, of 25, Victoria-street, S.W. 1. It is understood that there will be about 7,000 ft. of new roads constructed on this estate in connection with the present scheme. The plans are being prepared by Mr. H. V. Milnes Emerson, A.R.I.B.A., of 11, Campbell-road, West Croydon. The asphalting will be done by Messrs. Excel Asphalte Co., Ltd., Ceslym Works, Dorset Wharf, Hammersmith, W. 6. The shops now in course of erection will be for sale, freehold, when completed. It is probable that work on the housing scheme will commence shortly.

WOOD GREEN.—An extension is being made to the factory of Messrs. Barratt & Co., Ltd., manufacturing confectioners, of Mayes-road. The new building will occupy Nos. 12 to 24, Coburg-road, adjoining the rear of main factory, and will have a frontage of about 114 ft. with an average depth of 130 ft. The plans, which have been prepared by Messrs. P. J. Westwood & Emberton, architects, of 7, Adam-street, Adelphi, W.C.2, show a building of wedge shape, the widest portion being on the semi-circular frontage on which columns will be spaced at suitable intervals wide enough to permit the entrance of cars and lorries to the ground floor, which will be used as a garage. There will be double swing doors attached to these columns. The building will have five floors and will be composed of a steel frame and brick and reinforced concrete construction. It will have a flat asphalte roof and a front of white Portland cement up to first floor and the remainder Sussex stock facings. The ground floor will be composed of 6 in. concrete with B.R.C. reinforcement and granolithic. The other floors will be either teak or oak on hollow flooring blocks. There will be two goods lifts installed but no contract for this work has yet been placed. The general contract is being carried out by Messrs. James Carmichael (Contractors), Ltd., of 331, Trinity-road, S.W.18. The following sub-contracts have been decided:—Steelwork, Messrs. Redpath, Brown & Co., Ltd., of 3, Lawrence Pountney-hill, E.C.4; granolithic stairs, Messrs. Stuart's Granolithic Co., Ltd., of 63, Lincoln's Inn Fields, W.C.1; steel casements, Messrs. Henry Hope & Sons, Ltd., of 59, Berners-street, W.1; floors, Messrs. Diespeker & Co., Ltd., of 60, Holborn Viaduct, E.C.1.

COMMERCIAL-ROAD.—Messrs. R. Woollaston & Co., Limehouse, have just completed a building at 169, Commercial-road, E., which has been altered from club premises to a studio for Mr. O. Baumgart.

RATES OF WAGES IN THE BUILDING TRADE.

The following are the rates of wages in the building trade in England and Wales. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons	Bricklayers.	Carpenters, Joiners.	Plasterers	Slaters.	Plumbers.	Painters.	Masons' Labourers.	Bricklayers' Labourers.	Plasterers
Aberdare	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Accrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Altrincham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ashton-under-Lyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barnsley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barrow-in-Furness	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bath	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Bedford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Birkenhead	1/10	1/10	1/10	1/10	1/10	1/10	1/10			1/5½
Birmingham	1/8	1/8	1/8	1/8	1/8	1/9	1/8			1/3
Bishop Auckland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackburn	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackpool	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bolton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bournemouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Bradford	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bridgwater	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½			0/11½
Brighton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Bristol	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burnley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burton-on-Trent	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Bury	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Cambridge	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cardiff	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chatham	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Chelmsford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cheltenham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Chester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chesterfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Colchester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Coventry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Crewe	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Darlington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Derby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Doncaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Dudley	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Durham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
E. Glam. (Mon. Vall.)	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Eastbourne	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Exeter	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Folkestone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Gloucester	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Grantham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Grays	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Grimsby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Great Yarmouth	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Guildford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Halifax	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Harrogate	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hartlepools	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hastings	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Hereford	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Huddersfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hull	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ipswich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Lancaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Leeds	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leicester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Lichfield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Lincoln	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Liverpool	1/10	1/10	1/10	1/10	1/10	1/10	1/10			1/5½
Llanelly	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
London	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Loughborough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Luton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Maidstone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Manchester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Mansfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Merthyr Tydfil	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Middlesbrough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newcastle-on-Tyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newport, Mon.	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Northampton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Norwich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Nottingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oakham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Oldham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oxford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Plymouth	1/6	1/6	1/6	1/6	1/6	1/6	1/5			1/1½
Pontypridd	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Portsmouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Preston	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Reading	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Rochdale	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Rochester	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Rugby	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
St. Albans	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
St. Helen's	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Scarborough	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Sheffield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Shrewsbury	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Southampton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southend-on-Sea	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
South Shields	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockton-on-Tees	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stoke-on-Trent	1/8	1/8	1/8	1/8	1/8	1/9	1/0			1/3
Stroud	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4			1/0½
Sunderland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Swansea	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Swindon	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Taunton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Torquay	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Tunbridge Wells	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Wakefield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Walsall	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Warrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
West Bromwich	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Wigan	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Windsor	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Wolverhampton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Worcester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
York	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2

(For rates of wages in the Building Trade in Scotland see page 431.)

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

SEPTEMBER 25.—**Altrincham.**—PAINTING.—For the painting of the outside of the church of St. John the Evangelist, Altrincham. Wardens, Altrincham.

SEPTEMBER 25.—**Aylesbury.**—ADDITION.—Erection of a new wing to the Children's Home at Great Kimble, for the Board of Guardians. Mr. Fred Taylor, architect, Aylesbury. Deposit £1 1s.

SEPTEMBER 25.—**Aylesbury.**—SHED, ETC.—Erection of a shed, urinal and w.c. at the Cemetery, Tring-road, for the T.C. Mr. Wm. H. Taylor, Borough Surveyor, Town Hall, Aylesbury.

SEPTEMBER 25.—**Beckenham, Kent.**—EXTENSION.—Extension of the Electric Light Station, Churchfields-road, for the U.D.C. Mr. John A. Angell, Surveyor, Council Offices, Beckenham. Deposit £2.

SEPTEMBER 25.—**Blackburn.**—PAVILION.—Erection of pavilion in Roe Lee Park, for the T.C. Mr. A. T. Gooseman, Borough Engineer, Town Hall, Blackburn.

SEPTEMBER 25.—**Buxton.**—BATHS.—Reconstruction of the Natural Mineral Water Baths, in The Crescent, for the T.C. Mr. F. Langley, Borough Engineer, Town Hall, Buxton. Deposit £5 5s.

SEPTEMBER 25.—**Carlisle.**—HOUSES.—Erection of 40 houses on the Blackwell-road estate, for the T.C. Mr. Henry C. Marks, City Engineer, 18, Fisher-street, Carlisle.

SEPTEMBER 25.—**Durham.**—BUILDERS' WORK.—(1) Durham Johnston Secondary School: builder's work in connection with the construction of balconies and alterations to premises to provide means of escape in case of fire; (2) Cassop Council School: builder's work in connection with the alterations to out-offices, and drainage and laying main drain; (3) Chilton Buildings Council School: builder's work in connection with the reconstruction of boundary walls and play shed, for the Durham C.C. Mr. F. Willey, F.R.I.B.A., 34, Old Elvet, Durham.

SEPTEMBER 25.—**Edinburgh.**—CAR SHELTER.—Erection of a shelter at Braid Hills Car Terminus, Comiston-road, for the T.C. Mr. James A. Williamson, City Architect, City Chambers, Edinburgh.

SEPTEMBER 25.—**Hayes, Middlesex.**—HOUSES.—Erection of 40 houses at Hayes, Middlesex, for the U.D.C. Housing Office, Botwell, Hayes. Deposit £5 5s.

SEPTEMBER 25.—**London, W.2.**—SHOPS AND OFFICES.—Erection of shops and offices. Apply by letter to A. H. Middleton, Architect, 56, Queen's-gardens, Hyde Park, W.2.

SEPTEMBER 25.—**Oldham.**—CONVERSION.—Conversion of the present waiting room in the Market-place into a shop, for the T.C. General Manager, Oldham Corporation Tramways, Wallshaw Depot, Oldham.

SEPTEMBER 25.—**Salford.**—SUB-STATION.—Erection of a small sub-station in Moor-lane, Kersal, for the T.C. Borough Electrical Engineer, Electricity Works, Frederick-road, Salford.

SEPTEMBER 25.—**Sheffield.**—PAINTING.—For internal painting at the Central Reference Library, Surrey-street, for the T.C. Mr. F. E. P. Edwards, City Architect, Town Hall, Sheffield.

SEPTEMBER 25.—**Shrewsbury.**—CONVERSION.—For the conversion of the existing buildings, formerly known as "The Women's Hostel," Monkmoor, Shrewsbury, into scarlet fever and diphtheria wards, and the erection of a new laundry, disinfection and mortuary block, &c., for the Shrewsbury and Atcham Joint Hospital Board. Mr. V. G. Santo, A.R.I.B.A., 19, College-hill, Shrewsbury. Deposit £1 1s.

SEPTEMBER 25.—**Stoke-on-Trent.**—HOSPITAL BUILDING.—Erection of new cubicle block at Bucknall Infectious Diseases Hospital, for the T.C. Messrs. Martin, Martin & W. H. Ward, architects, 106, Colmore-row, Birmingham.

SEPTEMBER 25.—**West Riding of Yorkshire.**—REPAIRS.—Repairs to the undermentioned holdings, on the Ryther-cum-Ulleskelf Estate, near Church Fenton, Yorkshire:—(1) Home Farm, Ryther Hill; (2) Cawkill's Farm, Ryther Hill; (3) Walsh's holding, Ryther Hill; (4) Paradise Lodge Farm, Ryther; (5) Farfield House Farm, Ryther. County Land Agent, County Hall, Wakefield. Deposit £1 1s.

SEPTEMBER 25.—**Whitley Bay.**—CONVERSION.—For converting the Park Hotel, Whitley Bay, into public offices, for the U.D.C. Mr. A. J. Rousell, Surveyor, Council Offices, Whitley Bay. Deposit £1 1s.

SEPTEMBER 26.—**Glamorganshire.**—VARIOUS WORKS.—The Glamorgan County Council Education Committee wish to contract the following works, subject to their usual conditions and agreement:—(*a*) Abertridwr Mixed and Infants' Schools; remodelling of w.c.'s; (*b*) Pontywaun Council School, new playsheds; (*c*) South Bargoed Boys' Council School, electric lighting; (*d*) Fochriw Mixed School, electric lighting; (*e*) Pontypridd Girls' Intermediate School, painting and decorating caretaker's house; (*f*) Pontypridd, Girl's Intermediate School, electric lighting; (*g*) Trelewis Mixed School, minor works; (*h*) Bedlinog Girls' School, concrete retaining wall; (*i*) Glyncorrwg Council School, rebuilding boundary walls and walls of cloakroom. T. Mansel Franklyn, Secretary to Education Committee, County Hall, Cardiff.

SEPTEMBER 26.—**London, S.W.18.**—HOUSES.—Separate tenders for the erection and completion of (a) 24 further non-parlour houses on the Watney Estate, Southfields, (b) 28 further non-parlour houses on the Furzedown Estate, Tooting, for the Metropolitan Borough of Wandsworth. Architects: Watney Estate, G. L. Elkington, A.R.I.B.A., Norfolk House, 7, Laurence Pountney-hill, E.C. 4; Furzedown Estate, H. B. Elkington, A.R.I.B.A., Norfolk House, 7, Laurence Pountney-hill, E.C. 4. Deposit £2 in respect of each estate.

SEPTEMBER 26.—**Southampton.**—HOUSES.—Erection of 50 semi-detached houses on the Hampton Park Estate, for the County Borough. Borough Engineer's Office, Southampton. Deposit £1 1s.

SEPTEMBER 27.—**Elgin.**—COTTAGES.—Erection of three blocks of cottages, containing in all ten houses, in Maisondieu-road, for the T.C. Mr. Charles C. Doig, architect, Elgin.

SEPTEMBER 27.—**Manchester.**—GLAZING.—For patent glazing on the roof of the Retail Fish Market, Manchester. General Superintendent, Markets Office, Town Hall, Manchester.

SEPTEMBER 27.—**South Kirkby.**—VILLAS.—Erection of a pair of semi-detached villas at South Kirkby, near Wakefield, for the South Kirkby, Featherstone, and Hemsworth Collieries, Ltd. Messrs. Garside & Pennington, architects, Pontefract.

SEPTEMBER 27.—**Sowerby Bridge.**—BATH.—Reconstruction of swimming bath, for the U.D.C. Mr. J. Eastwood, surveyor, Sowerby Bridge.

SEPTEMBER 27.—**Walton.**—EXTENSION.—Extension to nurses' home at Walton Institution, for the West Derby B.G. Mr. Ernest B. Bailey, F.S.I., 37, Moorfields, Liverpool. Deposit £2 2s.

SEPTEMBER 28.—**London.**—DWELLINGS.—Erection of a block of dwellings on the Tabard Garden Estate, Southwark, for the L.C.C. Architect to the Council, The County Hall, Westminster Bridge, S.E. Deposit £3.

SEPTEMBER 28.—**Wallasey.**—OFFICE.—Erection of a left luggage office, &c. (wood structure) at New Brighton. Mr. W. H. Travers, Borough Engineer, Town Hall, Wallasey.

SEPTEMBER 28.—**Wortley.**—HOUSES.—Erection of: Ecclesfield, ten houses; Mortomley, 14 houses; Tankersley, six houses, for the R.D.C. Mr. Wynyard Dixon, architect, 16, St. James'-row, Sheffield. Deposit £2.

SEPTEMBER 29.—**Doncaster.**—BAKERY.—Erection of a bakery at the Balby Poor Law Institution, for the Board of Guardians. Messrs. Wilburn & Atkinson, St. George's Chambers, Doncaster.

SEPTEMBER 29.—**Hyde.**—TELEPHONE EXCHANGE.—Erection of a new telephone exchange at Hyde, for H.M. Office of Works. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

SEPTEMBER 29.—**Littleton.**—COTTAGES.—Demolition of 14 cottages and farm buildings, construction of 12 cottages, formation of drainage, fences, paving and paths, &c., at Littleton, for the Metropolitan Water Board. Mr. Henry E. Stilgoe, Chief Engineer, 173, Rosebery-avenue, Clerkenwell, E.C.1. Deposit £5.

SEPTEMBER 30.—**Blackpool.**—HOUSES, &C.—Erection of 68 houses, contained in seventeen blocks, and for house drainage and fencing respectively in connection therewith, for the T.C. Mr. Edgar D. Dennis, architect, 27, Clifton-street, Blackpool. Deposit £4 4s.

SEPTEMBER 30.—**Edinburgh.**—CONVENIENCE.—Erection of a public convenience at North Meadow Walk, for the T.C. Burgh Engineer, 1, Parliament-square, Edinburgh.

✱SEPTEMBER 30.—**Essex.**—SHELTER.—Erection and completion of a shelter on the Western Esplanade (at the foot of the inclined roadway), for the County Borough Council of Southend-on-Sea. Mr. Robt. H. Dyer, Borough Engineer, Municipal Buildings, Southend-on-Sea. Deposit £2.

✱SEPTEMBER 30.—**Harrow, Middlesex.**—GRAND STAND.—Grand stand to seat about 400 persons, supplied and erected on Sports Ground, Pinner View, Harrow, for the Old Lyonian Association. Mr. E. F. Chatham, 44, Roxborough Park, Harrow.

SEPTEMBER 30.—**Newton-in-Makerfield.**—HOUSES.—Erection of 16 type "A" houses (in brick) at the South Mesnes, Earlestown, for the U.D.C. Council's Surveyor, Town Hall, Earlestown.

SEPTEMBER 30.—**Poole.**—DRILL HALL.—Repairs and decoration at the R.G.A. Drill Hall, South-road, Poole, for the Dorset Territorial Army Association. Mr. C. W. Pike, *c/o* Mr. F. T. Maltby, A.M.I.C.E., M.S.A., architect, Dorchester.

SEPTEMBER 30.—**Southampton.**—SCHOOL.—Erection of a new school at Andover (with Army hutting), for the County Borough of Southampton. Mr. A. L. Roberts, County Architect, The Castle, Winchester. Deposit £1 1s.

OCTOBER 2.—**Broughton.**—HALL.—Erection of village hall. Mr. F. Henshaw, architect, Lloyds Bank Chambers, Andover. Deposit £1 1s.

✱OCTOBER 2.—**Clapton, E. 5.**—GARAGE.—Designs, accompanied by tenders, for the construction of a garage in reinforced concrete, for the Metropolitan Borough of Hackney, at Millfields-road. Mr. Norman Scorgie, M.Inst.C.E., Borough Engineer and Surveyor, Town Hall, Mare-street, Hackney. Deposit £1 1s.

OCTOBER 2.—**Glasgow.**—HOUSES.—Erection of 226 houses at Hawthorn-street, for the T.C. Mr. J. Lindsay, Town Clerk, City Chambers, Glasgow.

OCTOBER 2.—**Holmfirth.**—CONVENIENCES.—Erection of public conveniences, Towngate, for the U.D.C. Messrs. Abbey & Hanson, architects, 11, Cloth Hall-street, Huddersfield.

OCTOBER 2.—**Hoole.**—HOUSES.—Erection of 12 houses, for the U.D.C. Mr. Fred Davies, architect, 14, Newgate-street, Chester.

✱OCTOBER 2.—**Ipswich.**—WAR MEMORIAL.—For erection and completion of memorial of hard Whitbed monumental stone in Christchurch Park, for the County Borough. Mr. Edward Adams, A.R.I.B.A., 9, Herbert-street, Whitworth Park, Manchester. Deposit £2 2s.

OCTOBER 2.—**Lichfield.**—CONVENIENCES.—Erection of sanitary conveniences in the Market-place, for the T.C. Mr. Percy A. Benn, City Surveyor, Guildhall, Lichfield. Deposit £2 2s.

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Brick-layers.	Car-penters, Joiners.	Plas-terers.	Slaters.	Plum-bers.	Painters.	Masons' Labourers	Brick-layers Labourers	Plas-terers
Aberdeen	1/7	1/10½	1/7	1/7½	1/8	1/9	1/7	1/2 to 1/4		
Airdrie	1/8	1/8	1/8	1/8	1/8	1/8	—	1/4		
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2		
Arbroath	1/7	1/7	1/7	1/7	1/7	1/7	1/8	1/1		
Ayr	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Bathgate	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Blairgowrie	1/7	—	1/7	1/7	1/7	1/7	1/7	—		
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Coatbridge	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Dumfries	1/6	1/6	1/6	1/6	1/6	1/8	1/8	1/2	1/2½	1/3½
Dundee	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Dunfermline	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/2		
Duns	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/0		
Edinburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Falkirk	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	—	1/1½		
Galashiels	1/6	1/6	1/6	1/6	1/6	1/6	1/8	1/1½		
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Greenock	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/1 to 1/3		
Hamilton	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Hawick	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Helensburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Inverness	1/6½	—	1/6	1/7	1/6½	1/7	1/8	1/0 to 1/3		
Kilmarnock	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Kirkcaldy	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2		
Kirkwall	1/5	1/5	1/4	1/7	1/5	1/5	1/4	1/2		
Lanark	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3		
Leith	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/2		
Motherwell	1/8	1/8	1/8	1/8	1/8	1/8	—	1/3		
Perth	1/8	1/8	1/8	1/8	1/8	1/8	1/7	1/2		
Stirling	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Stirlingshire (Eastern District)	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/3		
Wishaw	1/8	1/8	1/8	1/10	1/8	1/8	1/9	1/3		

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 430.

OCTOBER 2.—**S.W. England.**—WORKS AND REPAIRS.—War Department contracts for works and repairs in the South-Western area from October 2, 1922. Separate tender for the various towns will be accepted. Royal Engineer Office, Mount Wise, Devonport.

OCTOBER 3.—**Chelsea, S.W.**—DECORATIONS.—Internal painting, whitewashing and repairs to the staircases and corridors of the main block at the Infirmary, Cale-street, Chelsea, for the Guardians of the Poor of the Parish of Chelsea. Mr. Edmund J. Harrison, architect, 23, Berkeley-road, Crouch End, N.8. Deposit £2.

OCTOBER 3.—**Hemel Hempstead.**—COTTAGES.—Erection of 10 cottages, for the Borough Council. Mr. Walter R. Locke, Borough Engineer and Surveyor, Market-square, Hemel Hempstead. Deposit £1 1s.

✱OCTOBER 3.—**London, S.W. 1.**—PAINTING.—For internal painting, &c., at the Admiralty (Blocks 1-4, and Old Building), for the Commissioners of H.M. Works, &c. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W. 1. Deposit £1 1s.

OCTOBER 3.—**London, S.W. 18.**—PAINTING.—Painting, &c., at the intermediate Schools, Swaffield-road, Wandsworth, S.W. 18. Mr. F. J. Curtis, Clerk, Union Offices, St. John's-hill, Wandsworth, S.W. 18.

OCTOBER 3.—**Monmouthshire.**—REPAIRS AND BUILDING ALTERATIONS.—The Small Holdings Committee of the Monmouthshire Agricultural Committee invites tenders for repair, alteration, and adaptation of farm buildings in the county, and some minor repairs to cottages on the holdings, for Messrs. S. G. Lewis, and R. O. Peterson, at Pensarn, about 5½ miles from Newport and 2 miles from Cymbran. Mr. A. Every-Clayton, County Land Agent, 2, Gold Tops, Newport (Mon). Deposit £1 1s.

✱OCTOBER 3.—**West Norwood.**—ALTERATIONS.—For execution of alterations at the Children's Infirmary, for the Guardians of the Poor of the Parish of Lambeth. Mr. James L. Goldspink, Clerk, Brook-street, Kennington-road, S.E. 11. Deposit £2.

OCTOBER 4.—**Colchester.**—VARIOUS WORKS.—For artificers' works, repairs and materials, at the following places in the Eastern area of the Eastern Command:—(1) Colchester; (2) Landguard, including Harwich, Ipswich, etc.; (3) Norwich, including Great Yarmouth; (4) Bury St. Edmunds; (5) Brentwood Division. F. A. K. White, Commanding Royal Engineer, Eastern Area, Royal Engineer Office, Colchester.

OCTOBER 5.—**Doncaster.**—HOUSES.—Erection of 60 houses of the "A" class, in Theobald-avenue and Chequer-avenue, for the T.C. Mr. R. E. Ford, Housing Surveyor, 3, Priory-place, Doncaster. Deposit £2 2s.

OCTOBER 5.—**Roehampton.**—HOUSES.—Erection on the Roehampton Estate, Putney, of 168 cottages, for the L.C.C. Architect to the Council, County Hall, Westminster Bridge, S.E. 1. Deposit £2.

OCTOBER 7.—**Oakham.**—LAUNDRY, ETC.—Erection of new laundry and alterations to buildings, for the Board of Guardians. Mr. F. W. Nichols, Market-place, Oakham. Deposit £1 1s.

OCTOBER 8.—**St. David's.**—PUBLIC HALL AND RESIDENCE.—The trustees for the erection of public hall, library and reading rooms at St. David's, invite tenders for all the work, including erection of care-taker's house. Mr. W. O. Williams, Secretary of Building Committee, St. David's.

OCTOBER 9.—**Nottingham.**—HOME, &C.—Erection of a new receiving home and alterations to the infants' home, Hartley-road, for the B.G. Messrs. Ernest R. Sutton & Son, F.R.I.B.A., Albion Chambers, King-street, Nottingham. Deposit £2 2s.

OCTOBER 9.—**Preston.**—BRIDGE.—Erection of retaining walls, abutments, &c., at Oxheys Bridge, over the L. & N.W. Railway, for the T.C. Borough Surveyor, Town Hall, Preston. Deposit £1 1s.

✱OCTOBER 10.—**France and Belgium.**—HEADSTONES.—For a total supply of 15,000 headstones, packed and delivered F.O.R., for the British Military Cemeteries. The Secretary, Works Dept., Imperial War Graves Commission, 82, Baker-street, London, W. 1.

✱OCTOBER 10.—**Hereford.**—SORTING OFFICE.—Erection of a station sorting office, for the Commissioners of H.M. Works, &c. Contracts Branch, King Charles-street, London, S.W. 1. Deposit £1 1s.

✱OCTOBER 11.—**Leytonstone, E.11.**—DEPOT, &C.—For the construction of motor dust van charging depot and cart and roller sheds at the Electricity Station, Cathall-road, for Leyton U.D.C. Mr. Ernest H. Essex, A.M.I.C.E., Town Hall, Leyton. Deposit £2 2s.

✱OCTOBER 14.—**Colwyn Bay.**—NEW BLOCK, &C.—Erection of new Nursing Block (47 beds) and additions and alterations to the existing hospital in Hesketh-road, for the Building Committee of Colwyn Bay and West Denbighshire Hospital. Mr. S. Colwyn Foulkes, A.R.I.B.A., Architect, Central Chambers, Colwyn Bay. Deposit £3 3s.

OCTOBER 17.—**Walsall.**—HOUSES.—Erection of 20 houses in two blocks of ten in Lord-street; 19 houses in three blocks of six and seven in Green-lane, for the T.C. Mr. John Taylor, Council House, Walsall. Deposit £1.

NO DATE.—**Ardsley, near Barnsley.**—PAINTING.—For the painting and varnishing of the whole of wood and ironwork outside the club. Mr. A. Wollerton, Ardsley Working Men's Club, Ardsley, near Barnsley.

NO DATE.—**Castleford.**—EXTENSION.—For extension of business premises and enlargement of the Co-operative Hall, &c., Carlton-street, Castleford, for the Castleford Co-operative and Industrial Society, Ltd. Mr. Arthur Hartley, Architect, County Chambers, Castleford.

NO DATE.—**Rayleigh.**—BUNGALOW.—Erection of a bungalow in Daws Heath-road, Rayleigh, for the Rayleigh Nursing Association. Mr. A. L. Turner, architect, High-street, Rayleigh.

NO DATE.—**South Kirkby.**—CINEMA.—Erection of cinema at South Kirkby, near Wakefield, for the South Kirkby Cinema Co., Ltd. Messrs. Garside & Pennington, architects, Pontefract.

NO DATE.—**West Hartlepool.**—CONVERSION.—Conversion of offices to flats, Whitby-street, for the T.C. Borough Engineer, Municipal Buildings, West Hartlepool.

FURNITURE, MATERIALS, etc.

SEPTEMBER 25.—**Bucklow.**—MATERIALS.—Supply of road materials to the R.D.C. Mr. R. C. Cordon, Highway Surveyor, Knutsford.

SEPTEMBER 25.—**Hemel Hempstead.**—ROAD MATERIALS.—Supply to the T.C. of 100 tons 1 in. slag tar macadam and 100 tons 2 in. broken slag. Mr. Walter R. Locke, Borough Engineer, Market-square, Hemel Hempstead.

SEPTEMBER 25.—**London.**—OILS.—Supply to the Commissioners of His Majesty's Works of (1) animal and vegetable oils; (2) machinery and crank chamber oils, &c.; (3) motor and cylinder oils, &c.; (4) turpentine. Controller of Supplies, H.M. Office of Works, &c., King Charles-street, S.W.1.

SEPTEMBER 25.—**Manchester.**—PAVING BLOCKS, &C.—Supply of (a) 38,000 karriwood or creosoted deal paving blocks, and (b) granite setts, to the T.C. Paving &c., Department, Town Hall, Manchester.

SEPTEMBER 25.—**Penarth.**—SUPPLIES OF STONE AND GRAVEL.—For supply of mountain limestone and gravel, and basalt or granite gravel up to March 31, 1923, to the Penarth U.D.C. Mr. Edgar I. Evans, A.M.I.C.E., Surveyor, Council Offices, Penarth.

SEPTEMBER 25.—**Repton.**—MATERIALS.—Supply of road materials to the R.D.C. Mr. H. S. Askew, Clerk, Union Offices, Burton-on-Trent.

SEPTEMBER 25.—**Westminster.**—MATERIALS.—Supply of road and other materials to the C.C. Mr. John Hunt, Town Clerk, City Hall, Charing Cross-road, W.C.2.

SEPTEMBER 26.—**Belfast.**—MATERIALS.—Supply of stores to the Tramways Committee. General Manager, Tramways Dept., Belfast.

SEPTEMBER 26.—**Bridgend.**—MATERIALS.—Supply of stores to the Mid-Glamorgan Water Board. Mr. Eiryn W. Davies, Manager, Water Board Offices, Bridgend, Glam.

SEPTEMBER 26.—**Knaresborough.**—GAS FITTINGS.—Supply of incandescent gas fittings, to the B.G. Master, 2, Stockwell-road, Knaresborough.

SEPTEMBER 26.—**Lambeth.**—ROAD MATERIALS.—Supply to the B.C. of paving setts, granite setts, sawn stone paving, creosoted deal wood blocks, and compressed asphalt paving. Mr. H. E. Anderson, Borough Engineer, Town Hall, Brixton, S.W.2.

SEPTEMBER 26.—**Loughton.**—ROAD MATERIALS.—Supply of granite, hoggin, steam rolling, &c., to the U.D.C. Mr. Horace White, Surveyor, Loughton, Essex.

SEPTEMBER 26.—**Maesteg.**—MATERIALS.—Supply of cement, ironmongery, stoneware pipes, bricks, stone flagging, kerb, and channel, cast-iron pipes, &c., to the U.D.C. Mr. Samuel J. Harpur, M.S.A., Surveyor, Council Offices, Maesteg.

SEPTEMBER 26.—**Manchester.**—BOARDS.—Supply of pitch pine and spruce boards to the Swinton Schools, for the Board of Guardians. Mr. Hargreaves, Superintendent of Works, Union Offices, All Saints', Manchester.

SEPTEMBER 26.—**Salford.**—MATERIALS.—Supply of limestone chippings, flags and curbs, granite setts, tar macadam, cement, iron castings, earthenware pipes, &c. Borough Engineer, Town Hall, Salford.

SEPTEMBER 27.—**Johannesburg.**—BRASS LOCKS.—Supply to the T.C. of 1,475 brass locks. Department of Overseas Trade, 35, Old Queen-street, S.W.

SEPTEMBER 27.—**Rochester.**—MATERIALS.—Supply to the T.C. of Portland cement, brooms, oils, tools, &c. City Surveyor, Guildhall, Rochester.

SEPTEMBER 30.—**Haverfordwest.**—TOOLS.—For supply during twelve months ending September 30, 1923, of workmen's tools for Haverfordwest R.D.C. Mr. J. A. Rice, Highway Surveyor, Letterston (Pemb.).

SEPTEMBER 30.—**Mansfield.**—EQUIPMENT.—For furnishing and equipping the Ransom Sanatorium (80 beds), Mansfield, for Nottinghamshire County Council. County Medical Officer, Shire Hall, Nottingham.

SEPTEMBER 30.—**Stoke-on-Trent.**—LIME.—Supply of best lump lime to the T.C. Borough Sewage Engineer, Leek-road, Stoke-on-Trent.

OCTOBER 2.—**Maldon.**—ROAD MATERIALS.—Supply to the R.D.C. of broken granite, Kentish flints, gravel. Mr. E. J. Ennals, surveyor, 6, Market-hill, Maldon.

OCTOBER 6.—**London.**—MATERIALS.—Supply to the High Commissioner for India of:—(1) shovels; (2) cocks, bib and stop, galvanised; (3) point rodding, 1¼ in. Director-General, India Store Department, Belvedere-road, Lambeth, S.E.1.

OCTOBER 10.—**Egypt.**—STORES.—Supply of stores, including hardware, oils and paints, etc., to the Frontier Districts Administration, Alexandria. Department of Overseas Trade, 35, Old Queen-street, S.W.

NO DATE.—**Bolton.**—SLATE TANKS.—Supply of eight slate tanks, outside dimensions 7 ft. by 7 ft. by 2 ft. 8 in. Messrs. J. Brown & Co., Ltd., Bradley Fold, near Bolton.

ENGINEERING, IRON AND STEEL.

SEPTEMBER 23.—**Friern Barnet.**—SEWERAGE PLANT.—Supply of pneumatic ejectors, air compressors, gas engine, &c., to the U.D.C. Mr. F. P. Kindell, Surveyor, Council Offices, Friern Barnet-road N. Deposit £2.

SEPTEMBER 26.—**Glamorganshire.**—ELECTRIC LIGHTING.—For electric lighting at South Bargoed Boys' Council School, Fochriw Mixed Council School, and Pontypridd Girls' Intermediate School. Mr. T. Mansel Franklen, Clerk, County Hall, Cardiff.

SEPTEMBER 26.—**Glasgow.**—FENCE.—Erection of a corrugated and malleable iron fence, extending to 1,000 ft., at the Dalmuir Sewage Works, for the T.C. Office of Public Works, City Chambers, Glasgow.

SEPTEMBER 26.—**Mid-Glamorgan.**—MATERIALS.—The Mid-Glamorgan Water Board invites tenders for the supply of materials, as follows, to any part of the Board's area, for six months, commencing October 1, 1922:—Galvanised water piping and pieces for same, including all supplementary connectors, back nuts, elbows, bends, tees (equal and reducing), plain and diminishing sockets, caps, springs, long screws, nipples, crosses, etc., stop-cocks and union ferrules for lead and iron, caps and lining, ball valves, bib taps, brass bosses, lead piping (⅜ in. to 2 in.) in various weights per yard, plumber's solder, white lead, pig lead, stop-cock, surface boxes, leather washers, hack saws and blades. 2-gal. w.c. cisterns with bracket complete, fibre washers, pipe hooks (per gross), pipe cutter wheels, etc. Mr. Eiryn W. Davies, Water Board Offices, Bridgend.

SEPTEMBER 28.—**Thurnscoe.**—TUBES.—Providing and laying of about 2,200 lin. yds. of 6 in. steel tubes and certain special fittings, for the U.D.C. Mr. Thomas Bull, Engineer, Council Offices, Thurnscoe.

SEPTEMBER 28.—**Wycombe.**—WATER SUPPLY.—Provision and laying of 1,320 yds. of 3 in. and 4 in. cast-iron pipes and necessary valves, at Stokenchurch, for the R.D.C. Messrs. Lucas & Pyke, 39, Victoria-street, S.W. 1. Deposit £1.

SEPTEMBER 29.—**Birmingham.**—MACHINE TOOLS.—For power-driven lathes, machine tools, line shafting and pulleys, for Nechells Generating Station. Mr. E. J. Jennings, Secretary, 14, Dale-end, Birmingham. Deposit, £1 1s.

SEPTEMBER 29.—**London.**—RAILWAY MATERIALS.—Supply to the Bengal and North-Western Railway Co.: 200 pairs wheels and axles for carriages and wagons. Mr. E. A. Neville, Managing Director, 237, Gresham House, Old Broad-street, E.C.2. Charge 10s.

SEPTEMBER 29.—**London.**—MATERIALS.—Supply to the High Commissioner for India of (1) Tubing copper (solid drawn); (2) pins (split), and screws for wood; (3) files. Director-General, India Store Department, Belvedere-road, Lambeth, S.E. 1.

SEPTEMBER 30.—**Gellygaer.**—MATERIALS.—Supply of paving, kerb and channel drain pipes, cement and lime, cast iron goods, smith-work, etc., to Gellygaer U.D.C. Mr. John Evans, Clerk, Council Offices, Hengold.

SEPTEMBER 30.—**Stoke-on-Trent.**—FENCING.—For 400 yds. of iron fencing at the Hanley Sewage Works, for the T.C. H. Makepeace, Borough Sewage Engineer, Stoke-on-Trent.

OCTOBER 2.—**Mid-Glamorganshire.**—MAINS.—For laying 107 lin. yds. of 4 in. and 442 lin. yds. of 3 in. diameter cast iron mains with all necessary sluice valves, hydrants, etc., at Bridgend housing site, for the Mid-Glamorgan Water Board. Mr. E. W. Davies, Superintendent and Manager, Water Board Offices, Bridgend. Deposit £1 1s.

OCTOBER 3.—**Barton-upon-Irwell.**—LIFT.—Provision and erection of an electric lift at the Union Infirmary, Green-lane, Patricroft. Mr. P. Howard, A.R.I.B.A., 88, Mosley-street, Manchester. Deposit £2 2s.

OCTOBER 3.—**Lochmaben.**—HEATING INSTALLATION.—For central heating installation at Sanatorium about to be erected near Lochmaben. Mr. Evan Tweedie, architect, 43, Lady-street, Annan.

OCTOBER 4.—**London.**—RAILWAY MATERIALS.—Supply to the South Indian Railway Company of (1) 704 axle-boxes for wagons; (2) 36,000 fog signals; (3) rivets, nuts and pins. Mr. A. Muirhead, Managing Director, 91, Petty France, S.W. 1. Charge, 10s. per specification.

OCTOBER 4.—**London.**—RAILWAY MATERIAL.—Supply to the South Indian Railway Co. of (1) 46 metre gauge locomotives and six locomotive boilers; (2) 108 metre gauge wagons; (3) bridgework. Company's Offices, 91, Petty France, Westminster, S.W. 1. Charges, £2 for (1), and £1 for (2) and (3).

✱OCTOBER 6.—**South Kensington.**—STEEL CASEMENTS, &C.—For supply and delivery of steel casements, sashes, &c., at the New Science Museum, for the Commissioners of H.M. Works. Contracts Branch, King Charles-street, London, S.W. 1.

OCTOBER 9.—**Preston.**—BRIDGE.—Supply and erection of steelwork at Oxheys Bridge, over the L. & N.W. Railway, for the T.C. Borough Surveyor, Town Hall, Preston. Deposit £1 1s.

OCTOBER 21.—**Birmingham.**—DESTRUCTOR.—Supply and erection of a new destructor unit at the Montague-street Destructor Works, for the T.C. Mr. James Jackson, Superintendent, Salvage Department, Council House, Birmingham. Deposit £1 1s.

OCTOBER 26.—**London.**—MATERIALS.—Supply of brass sheets and rods and ebonite sheets and rods, for the Government of Australia. Supply Officer, Room 101, Australia House, W.C.

NOVEMBER 28.—**New Zealand.**—CRANE.—Suppy to the Auckland Harbour Board, New Zealand, of one 1-ton fixed pedestal crane for King's Wharf. Messrs. W. and A. McArthur, Ltd., 18-19, Silk-street, Cripplegate, E.C.2. Deposit £1 1s.

DECEMBER 18.—**Victoria.**—COAL HANDLING PLANT.—For coal handling plant for the Morwell Power scheme, for the Victorian State Electricity Commission. Agent-General for Victoria, Melbourne-place, Strand, W.C.2. Deposit £2 2s.

FEBRUARY 1, 1923.—**Auckland.**—ELECTRIC CRANES.—For the supply of twelve five-ton (alternatively three-ton) semi-portal balanced jib electric quay cranes, four five-ton (alternatively three-ton) balanced jib electric roof cranes, and six one-ton electric monorail cranes, for Auckland Harbour Board. Messrs. W. & A. McArthur, Ltd., 18-19, Silk-street, Cripplegate, London, E.C. 2. Deposit £2 2s.

NO DATE.—**Stourbridge.**—TUBES.—Supply to the Upper Stour Valley Main Sewerage Board of 1,810 yds. lin. of 1 in. galvanised wrought-iron tubes, "water quality," and fittings connected therewith. Mr. W. Fiddian, Engineer, 13, Church-street, Stourbridge.

ROAD, SANITARY, AND WATER WORKS.

SEPTEMBER 23.—**Blackhall.**—ROADS.—For the street formation and other works in connection with the erection of about 250 houses. Mr. James Hamilton, Blackhall Colliery Office.

SEPTEMBER 23.—**Bridlington.**—PAVING.—Providing and laying of about 1,600 sq. yds. of deal wood block paving, for the T.C. Borough Engineer, 1, The Crescent, Bridlington. Deposit £1 1s.

SEPTEMBER 25.—**Alnwick.**—VARIOUS WORKS.—(1) Cleaning out sewage ditch; (2) repairs to lining of reservoir; (3) laying 600 yards of earthenware pipes, for the R.D.C. Clerk, Alnwick.

SEPTEMBER 25.—**Southport.**—PAVING, &c.—Relaying of tramways and new wood block paving in centre of the town, for the T.C. Mr. A. E. Jackson, Borough Engineer, Town Hall, Southport. Deposit £3 3s.

SEPTEMBER 26.—**Windsor.**—MUDDING-OUT.—Mudding-out of Frogmore Lake, Windsor Castle, for the Commissioners of His Majesty's Office of Works, Contracts Branch, King Charles-street, London, S.W.1. Deposit £1 1s.

SEPTEMBER 27.—**Littlehampton.**—TENNIS COURTS.—For making four hard tennis courts, and one bowling green, for the U.D.C. Surveyor, Town Offices, Littlehampton.

SEPTEMBER 27.—**London, S.W.**—CONCRETE AND TAR PAVING.—New concrete paving and repairs to tar paving at the South Western Fever Hospital, Landor-road, Stockwell, S.W.9, for the Metropolitan Asylums Board. Office of the Board, Embankment, E.C.4. Deposit £1.

SEPTEMBER 27.—**Ruislip-Northwood.**—SEWERAGE WORKS.—Two revolving circular distributors to be erected at the Outfall Works, Ruislip, for the U.D.C. Messrs. Howard Humphreys & Sons, 28, Victoria-street, Westminster. Deposit £1 1s.

SEPTEMBER 28.—**Blackwood.**—SEWERS.—Construction of sewers in the Blackwood Special Drainage District between Kirkmuirhill Cross and Blackwood Cross, for the District Committee of the Lanark C.C. Messrs. Warren & Stuart, 94, Hope-street, Glasgow. Deposit £1 1s.

SEPTEMBER 28.—**Strood.**—ROADS.—Widening of two roads, for the R.D.C. Mr. L. Randerson, surveyor, Meopham, Gravesend.

SEPTEMBER 29.—**Merton.**—ROADS.—Supplying and laying about 7,000 square yards of tar macadam on roads on the Whatley Estate Housing Site, for the U.D.C. Mr. G. Jerram, Surveyor, Council Offices, Kingston-road, Merton, S.W.19.

SEPTEMBER 30.—**Rotherham.**—SEWERAGE.—For the construction of (1) Sewage disposal works (tanks and filters) and 9 in. stoneware pipe sewer in the Parish of Wickersley; (2) sewage disposal works (tanks and filters) and 9 in. stoneware pipe sewer in the parish of Dalton, for the R.D.C. Mr. C. O. Rawstron, Surveyor Imperial Buildings, Rotherham. Deposit £3 3s.

OCTOBER 2.—**Hayes.**—ROADS.—For the widening of Coldharbour-lane and construction of sewer, &c., for the U.D.C. Mr. D. C. Fidler, surveyor, Hayes. Deposit £2 2s.

OCTOBER 11.—**Aberdeen.**—WATER WORKS.—Laying and jointing of 2 miles of 48 in. mild steel piping and ancillary works, for the T.C. Mr. George Mitchell, Water Engineer, 41½, Union-street, Aberdeen.

OCTOBER 11.—**Crewe.**—SEWERAGE WORKS.—Construction of storm water tank, 120 ft. by 60 ft., and percolating filter, 100 ft. diameter, for the T.C. Mr. L. St. G. Wilkinson, Borough Engineer, Municipal Buildings, Crewe. Deposit £2 2s.

OCTOBER 14.—**Margate.**—WATERWORKS.—For sinking of shafts and extending adits of about 1,000 yards in connection with the Corporation water supply at Wingham. Mr. E. A. Borg, 13, Grosvenor-place, Westminster, S.W.

OCTOBER 21.—**Newport (Mon).**—WATERWORKS.—Laying and jointing of about 28 miles of cast-iron pipes, construction of a service reservoir, bridges, valve houses, and other works, for the T.C. Messrs. G. H. Hill & Sons (Westminster), 3, Victoria-street, Westminster. Deposit £5.

Competitions.

(See Competition News, page 404.)

Auction Sales, Tenders, etc.

SEPTEMBER 26.—**London, N.**—Messrs. Joseph Hibbard & Sons will sell, by order of Messrs. Brand, Pettit & Co., owing to dissolution of partnership, the freehold modern factory premises and residence used as joinery works, known as 247, West Green-road (one minute from West Green Station (G.E.R.) brick-built mill with glass roof timber-built annexe, residence of eight rooms and bathroom. Auctioneers, 15, Newington-green, Islington, N.

SEPTEMBER 26.—**Stanmore, Middlesex.**—Messrs. J. T. Skelding & Co. will sell, by order of Messrs. Kirby & Co., upon their premises, works and sawmills, Stanmore, Middlesex, surplus builders' and contractors' plant, stock timber, woodworking machinery, &c. Auctioneers, 48, Gresham-street, Guildhall, E.C.2.

SEPTEMBER 26 AND 27.—**Herts.**—Messrs. Joseph Hibbard & Sons will sell, by order of Messrs. Timber Operators & Contractors, Ltd., at the Depot, Marshmoor Mill, Herts (two miles from Hatfield, on the main London road), stock of dry English timber, including ash and oak, &c. Auctioneers, 15, Newington-green, Islington, London, N.16.

SEPTEMBER 26 AND 27.—**London, N.**—Messrs. Joseph Hibbard & Sons will sell without reserve, by order of Messrs. Brand, Pettit & Co., owing to dissolution of partnership, upon the premises, 247, West Green-road, and Downhill Farm, Downhill Park-road, close to West Green Station (G.E.R.), and near to Queen's Head, Wood Green, the plant and stock of builders, contractors and saw mills, including office furniture. Auctioneers, 15, Newington-green, Islington, N.16.

✱SEPTEMBER 28.—**Westminster, S.W.**—Messrs. Veryard & Yates, F.A.I., will sell, without reserve, hut sections, timber, &c., to clear site, Smith-square. Auctioneers, 365, Norwood-road, S.E.27.

SEPTEMBER 28.—**Woodford, Essex.**—Messrs. Joseph Hibbard & Sons will sell, without reserve, *re* Woodford District Council Housing Scheme, at the Depot, Danbury Way, Snakes-lane (three minutes from Woodford Station, G.E. Rly., and ten minutes from Castle Hotel, Woodford Green), timber and building material, drain pipes, new hob register stoves, &c. Auctioneers, 15, Newington Green, Islington, N.16.

✱OCTOBER 2, 3, AND 4.—**Newbury.**—Messrs. F. H. & C. E. Clark will sell, without reserve, the whole of the materials contained in Newbury Depot. Auctioneers, Beddington House, Beddington, Croydon.

✱OCTOBER 3, 4 AND 5.—**W. Norwood, S.E.**—Messrs Veryard & Yates, F.A.I., will sell at Dunbar Works, Government stores, &c. Auctioneers, 365, Norwood-road, S.E.27.

✱OCTOBER 4 AND 5.—**Henley-on-Thames.**—Messrs. Joseph Hibbard & Sons will sell without reserve, by order of A. West, Esq., to clear site at Henley-on-Thames (adjoining railway station yard and Reading-road), stock and plant of English timber and sawmills, including machinery, railway track, lorries and cart horses, office furniture, &c. Auctioneers, 15, Newington Green, Islington, London, N.16.

OCTOBER 10.—**Kent.**—Messrs. John D. Wood & Co. will sell (unless previously disposed of) at the London Auction Mart, 155, Queen Victoria-street, E.C., by order of the mortgagees in possession, the freehold property known as the Orpington Golf Course, extending to about 66½ acres, with modern club house. Auctioneers, 6, Mount-street, London, W.1.

✱OCTOBER 10.—**London, E.C.**—Messrs. Fuller Horsey, Sons & Cassell will sell, by order of the Port of London Authority, at the Merchants' Hall, Baltic Exchange, St. Mary Axe, builders and contractors' plant, &c. Auctioneers, 11, Billiter-square, E.C.3.

Public Appointments.

SEPTEMBER 27.—**North Woolwich.**—District Surveyor for the district of Woolwich required by the London County Council. Candidates must be between the ages of 28 and 50 years on the latest date for receiving applications, and must hold the certificate of the R.I.B.A. under section 140 of the said Act. Mr. James Bird, Clerk to the London County Council.

✱OCTOBER 4.—**Bridgwater.**—Assistant to the Borough Surveyor for the T.C. Borough Surveyor, Municipal Buildings, Bridgwater.

OCTOBER.—**India.**—Assistant Inspector of stores required by the High Commissioner for India. Director-General, India Store Department, Belvedere-road, Lambeth, S.E.1. (Quote Ref. S.5967/1922.)

WORK IN THE DEVASTATED WAR AREAS.

MESSRS. DE LUBERSAC, President of the General Federation of Co-operators in the Reconstruction, de Saint Maurice, President of the Union of Syndicates of Registered Architects of the Devastated Areas, and Despagnat, President of the National Federation of Building and Public Works, at a meeting on the 21st ult., unanimously recognised that, in order to utilise the greatest amount of raw material to be furnished by Germany as payment in kind, it was indispensable that an agreement should be concluded between the General Federation of Co-operators, the Union of the Syndicates of Architects, and the National Federation of Building and Public Works, on the following basis:—

1. There shall be created an "Office of Payments in Kind," composed of representatives of the Unions of Co-operators in Reconstruction, the Union of the Syndicates of Registered Architects, and the National Federation of Building and Public Works. This office, working with the administrative council of the Federation of Co-operators, will be charged with the study of all questions relative to the payments in kind by Germany, and the determination of the practical means of dispatching the orders, and the reception of goods.

2. The actual giving of orders, and the reception of material and German goods, will be effected with the help of the Office of Payments in Kind, by the General Federation of the Co-operators in Reconstruction.

3. Each Union of Co-operators will be invited to create, by the side of the council of administration, a "Commission of Materials," composed of representatives of co-operators, architects, and contractors working in the province under its jurisdiction.

The architects and contractors above mentioned are to participate in the Office of Payments in Kind, and the Commissions of Material set up in conjunction with the Unions of Co-operators, through the respective associations of Unions of the Syndicates of Registered Architects, and the National Federation of Building and Public Works.

PROPOSED NEW BUILDINGS & OTHER WORKS.*

IN these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERAYRON.—At the last meeting of the Council Messrs. Eric Williams & Pennant James attended with reference to the projected electricity supply scheme they intend inaugurating in the district. Further negotiations will take place.

ASHFORD.—The U.D.C. has passed plans for houses submitted by Messrs. Albones, Watson & Allis.

BAKEWELL.—The Ministry of Health has sanctioned an application by the Haddon District Hospital Committee to erect a large isolation hospital off Monyash-road, Bakewell.

BARNET.—Plans submitted by Mr. T. Cude, for the erection of shops and flats at the southern corner of Fitzjohn-avenue and the High-street, have been forwarded by the U.D.C. to the Ministry of Health for their observations.

BARNSLEY.—The sanction of the Ministry of Health has been received to the borrowing of £1,300, repayable in 10 years, for the installation of a new system of heating and ventilating the Public Hall.—Plans passed by T.C.: J. Porter, garage, off Agnes-road; W. Brammer, alterations to school house into dwelling-house, Pontefract-road, Hoyle Mill; Hilton, dwelling-house, Salisbury-street; Montague Burton, Ltd., shop and billiard-room, Cheapside and Queen-street South; J. Thompson, garage, off Southwell-street; J. Thompson, two dwelling-houses, Swift-street; F. Bambridge, house, Patrick's Gardens, Cockerham-lane, Barnsley; E. Round, house and lock-up shop, Palm-street, Old Town; E. Stapies, drying shed, rear of 190, Sheffield-road; J. Potts, garage, off Victoria-road, Barnsley; J. Kellett, motor shed, rear of 52, Derby-street; Barnsley Canister & Engineering Co., new stores and canteen, Sackville-street.

BARNSTAPLE.—The T.C. has approved of a scheme for the improvement of the Strand at a cost of £6,000.

BEDWELLTY.—The U.D.C. has instructed the surveyor to report on the proposed erection of a new mortuary for the district.

BERWICK.—The T.C. has decided to send a deputation to the Government Department concerned to press Berwick's claims for harbour development. It has also pledged the rates in support of the development scheme "to the extent of at least 2d. in the £1 if required." It is stated that the want of a good harbour is delaying a scheme for the industrial development of the district around Berwick, which is said to be rich in coal.

BIGGLESWADE.—Plans passed by R.D.C.: Galvanised iron building, The Green, Stotfold, for Mr. F. Scott; alterations to Bath Villa, Bedford-road, Sandy, for Mr. W. Yeadon.

CORK.—Practical steps in the reconstruction of Cork have been taken by the establishment in that city of several temporary Government offices, including Local Government, Labour, Engineering, Housing, and Finance. The difficulty of communicating with Dublin is overcome by the existence of these offices, the heads of which are authorised to deal with all matter affecting their respective departments. The chief of the Engineering Department, Mr. O'Dwyer, has given the sanction of the Ministry to various proposed works in the city and district, involving heavy expenditure. Mr. O'Byrne, chief of the Housing Department, came to Cork to assist in expediting the rebuilding of the destroyed areas in the city, and in this he will have the assistance of Mr. O'Dwyer and the general co-operation of the Engineering Department. Mr. O'Byrne will also assist in carrying out the Corporation's housing schemes for workers. Mr. McAuliffe, chief of the Labour Department, has engaged in the settlement of various trade disputes, and Mr. Brennan, chief of the Finance Department, has been negotiating with the owners of destroyed property with a view to immediate rebuilding. At a special meeting of the Corporation it was decided unanimously to rebuild the City Hall and Municipal Buildings and Carnegie Library on the old sites. The work is to proceed as soon as possible. A prize of one hundred guineas will be offered for the best plans.

DARLINGTON.—The Streets Committee has passed plans for over 30 houses to be erected by private enterprise.

DUNDEE.—Plans passed by T.C.: Adelaide-place, dwelling-house for W. Stevenson; Ellislea-road, West Ferry, dwelling-house for T. L. Miller; Ellislea-road, West Ferry, garage for T. L. Miller; Monifieth-road, Barnhill, additions for W. B. Dickie; Perth-road, alterations for the Dundee Parish Council; Reform-street, alterations for the Dundee Liberal Association; Strathmartine-road, Downfield, W.C., &c., for J. Barn.—It was stated at the last meeting of the Governors of the Royal Infirmary that Board has under consideration a scheme for large extensions at Caird Hospital. The cost is estimated at £17,000 for the building and £5,000 for equipment.

EBBW VALE.—It was reported to the U.D.C. meeting that sanction, providing contract prices are favourable, to erect 50 additional houses had been given by the Ministry of Health.

EDINBURGH.—A special committee on unemployment recommends the T.C. to proceed with road improvement schemes estimated to cost £100,000.

* See also our List of Contracts, Competitions, etc.

FAVERSHAM.—Plans passed by R.D.C.: Additions to premises at Boughton, for Mr. Colegate; bungalow, Brogdale-road, for Messrs. Whiting Bros.

HALIFAX.—The Housing Committee recommends to the T.C. that they should proceed with Mr. John Carter's scheme for 500 houses, and seek power to borrow £200,000 for the purpose.

HALTWHISTLE. — Plans submitted by Messrs. Robson for a motor garage to be erected at Station-road, and for four huts to be erected at Gilsland, for the Thirlwall Coal Co. have been passed by the U.D.C.

HEMSWORTH.—Mr. P. M. Crosthwaite, of the Ministry of Health, has held an inquiry relative to the applications of the R.D.C., for sanction to borrow the sums of £1,600 and £1,450, the former for the extension of sewage disposal works at Shafton, and the latter for works of water supply for the townships of Ryhill and Hancroft. There was no opposition at either inquiry.

HOLME CULTRAM.—Plan passed by U.D.C.: Mr. H. Hodgkinson, on behalf of Mr. Wardle, for a bungalow at East Cote.

HULL.—A Ministry of Health inquiry has been held into the proposal of the Corporation to construct an underground lavatory at a cost of £13,000.

LAMPETER.—The U.D.C. has agreed to Mr. William Jones making application for a provisional order for an electricity supply undertaking.

LIVERPOOL.—Described as the most valuable shopping site in the provinces the land occupied up till three years ago by St. Peter's Church, has been the subject of a Ministry of Health inquiry. The Corporation is proposing to purchase it from the Ecclesiastical Commissioners for £235,000, and, after providing for street improvements, to develop it for good-class retail businesses. The inquiry had reference to their application for borrowing powers. The scheme was opposed by the National Citizens' Union on the grounds that the price was excessive, the time was inopportune for purchase, and development of the site should more wisely be left to private enterprise.

LLANTRISANT.—The U.D.C. has given the statutory notice of application for permission to divert the road-way leading from Llantrisant-road, Pontyclun, to Miskin-road, Llantrisant. The work will include subsidiary undertakings in respect to adjacent roads.

LONDON (CAMBERWELL).—Drainage plans passed by B.C.: Blocks B, C and D, rear of Nos. 471–487, Old Kent-road (City Corporation Housing Scheme), for Whitehead, Ltd.; "The Wyndham Arms," 71 and 73, Wyndham-road, for Mr. Francis; workshops, 288, Croxted-road, for Bath & Co., Ltd.; 39 and 41, Copleston-road, for Mr. Newton; 12, Aulay-street, for Mr. Lyons; "Camberwell Arms," 17, Kimpton-road, for Mr. Dixon; Railway Arch, No. 368, Camberwell Station-road, for Parker & Sons Ltd.; 40, East Dulwich-road, for Champion & Son; 97–103, Burbage-road, for Cook & Co., Ltd.; 135–139, Cobourg-road and factory at rear, for Brittain & Sons, Ltd.; 31–37, Harling-street, for Mr. Colman; Rolls' Factory, Batten's-yard, for Mr. Collins; 141, Cobourg-road and stable at rear, for Mr. Toye; 170–194, Court-lane, for Mr. Williams; 281 and 283, Rye-lane, for North, Robin & Wilsdon; new surface water gully between Blocks A. and M., Peabody-buildings, Camberwell Green, for Holland & Hannen & Cubitts, Ltd.; bath-house next swimming bath, Dulwich College, College-road, for Holland & Hannen & Cubitts, Ltd.; two houses next 184, Turney-road, for Harrison & Co.; 8, Verney-road, for Webb, Ltd.; 25, Eynella-road, for Mr. C. Bradford; new hall at rear of 36, Talfourd-road, for The Unity Builders' & Decorators' Co., Ltd.; 32 and 33, Domville-grove, for Mr. Morgan; 292 and 284, Albany-road, for Green & Sons; 321, Southampton-street, for Mr. Blackmore; 188, Queen's-road, for Mr. Oldman; 167, Rye-lane, for Dowton & Co.; 161, Queen's-road, for Vanstone, Ltd.; new lavatory, 8, Verney-road, for Mr. Cearns.—Plans passed by L.C.C.: House, Court-lane, for Mr. E. W. Banfield; 13 and 24 houses, Court-lane, for Mr. A. Williams.

MAESTEG.—The Council has under consideration the M.O.'s recommendation that motor traction be substituted for horse haulage of refuse, &c. Surveyor has been instructed to prepare plans and estimates for the erection of a public abattoir. The provisional estimate is £5,000. Plans of swimming baths are also to be submitted.

MANSFIELD.—Plans passed by the T.C. R. Lane, house, Berry Hill-lane; A. H. Harman, addition to house, Eakring-road; J. Beckett, additions to house, King Edward-avenue; H. Crofts, bungalow, Stella-street; W. H. Robinson, bungalow, High Oakham-road; F. Pickard, house, High Oakham-road; J. Templeman, storeshed, Midworth-street; J. W. Wainman, house and shop, Southwell-road, Rainworth; The Mansfield Leather Co., workshop and storeroom, Newgate-lane; C. Coleman, house, Park-avenue; T. Foster, house, Park-avenue; St. Peter's Church Trustees, Church hall, Brunts-street; Mr. Widdowson, conversion of dwelling-house into two shops, Clumber-street; Geo. Butler, bungalow, Stella-street; J. Harrop White, additions to house (Layton Burrow), St. John's-place; Acetylene Welding Co., office, &c., to works, Victoria-street; R. Allen, additions to lock-up shop, Broxtowe-drive; Mrs. E. M. Guilor, stable, Southwell-road.

MARKET HARBOROUGH.—A scheme is on foot for the erection of a new ambulance station. The U.D.C. have promised to give a piece of their land in Abbey-street as a site. It is intended to erect a building with sufficient space on the ground floor to house the motor ambulance waggon and appliances, whilst above there will be instructional and recreation rooms.

MERTHYR TYDFIL.—The Parks and Cemeteries Committee has deputed members to visit sites at Golgerrig and Pant, and report on practicability of laying them out as recreation grounds. The Committee has decided to approach Miners' Welfare Fund Committee for a grant toward estimated £10,000 cost of land acquisition at Merthyr Vale from Messrs. Nixon's Navigation Co. This land will be laid out as a public park. The Ministry of Health has sanctioned £978 expenditure on recreation ground improvement at Treharris.

MORECAMBE.—A conference has been held of representatives of Barrow T.C., Dalton and Ulverston U.D.C.'s, and Ulverston R.D.C., when consideration was given to the proposed new road along the shores of Morecambe Bay, running from Barrow through Rampside to Aldingham and Bardsea, with a view to providing work for the unemployed. There was unanimous agreement as to the necessity for such a road, even apart from providing work. The surveyors are to prepare plans and estimates, and a Government grant is to be asked for.

MYNYDDISLWYN.—Plans passed by R.D.C.: Garage at Ynysddu, for Mr. L. Hunt; bungalow, Elim-road, Pontllanfraith, for Mr. Roach; billiard hall, Maindee-road Cwmfelinfach, for Mr. Townley; lay-out plan of building land and new streets near Cwmalsie, for the Llanarth Estate; new frontage line to road near old Elim Chapel, Pontllanfraith; alterations to two cottages at Tonymoch, for Sir Wm. James Thomas; five new shops and dwelling houses on New-road, Cwmfelinfach, for Councillor W. Phillips, Ynysddu.

NARBERTH.—The Council is to undertake new sewers installation at the Ash Hill and Bushes localities.

NEATH.—The Gnoll Hall Cinema and Variety House, Neath, has changed hands, the business having been sold to a local private syndicate, who has secured the lease of land opposite the Great Western Railway at Neath and between the bank and the county police station, where they propose to erect a new and commodious building.

NELSON.—Plans passed by T.C.: Borough Brick Co., additions, Railway-street; executors of H. Nelson, lavatories, &c., Hendon Mills; trustees of Carleton Club, wooden building, back Howarth-street; S. Clayton, store, 229, Brunswick-street; Broadbent & Parker, store, off Hibson-road; J. Green, store, Walton-lane; J. Green, garages, off Lee-road; Massey Bros., garage, off Percy-street; executors of W. Lambert, store and drying shed, Spring Bank Works; J. Shepherd, garage, Lee-road.

NETLEY ABBEY.—Netley Abbey, the fine old ruin near Southampton, which was one of the abodes of the Cistercian Monks, is to be restored by H.M. Office of Works.

NORTHENDEN.—The ancient tower of the Parish Church is to be restored, and it is expected that about £2,000 will be required. The tower is one of the finest landmarks in Cheshire. The battlemented parapet has been found "dangerously decayed," and it will be rebuilt. Other parts of the building are in a bad state.

NOTTINGHAM.—£3,000 is to be contributed by the Notts. Miners' Welfare Committee towards the cost of erecting a public library for the benefit of miners residing in the Radford and Lenton districts of Nottingham.

OGMORE AND GARW.—The Ogmore and Garw Council has assented to the Ffaldau Colliery Co. enclosing ground about which there was right of way question on condition to the Company agreeing to end of the projected new Council bridge at Squirrel Hill abutting on the Company's land. The bridge question will now finally be decided.

ORSETT.—The Ministry of Health has approved the plans for alterations and additions to the Workhouse Infirmary.

OXSHOTT.—A plan has been approved for a new gas main at Oxshott, from Charlwood Farm to Oakshade-road.

PHILLACK.—The U.D.C. has received from the Ministry of Health sanction of a £5,000 loan for sewerage works at Ventonleague-row, Clifton-terrace, and Bodriggy-villas.

PONTYPRIDD.—Tramway track relaying is being considered by the U.D.C. One short stretch, reported by the Surveyor as requiring immediate attention, from Gas-road to G.P.O., is estimated to cost £500.

RHONDDA.—At a meeting of the Rhondda U.D.C. it was reported that sums of £10,000 and £8,000 were included, respectively, for new roads from Pontrhondda to Gelli and Ton Pentre to Cwmpare in the estimated expenditure for the half-year commencing October 1.

ROSENEATH.—At a meeting of the General Committee of the Wrexham and East Denbighshire War Memorial Hospital, it was reported that after prolonged negotiations the trustees of the late William and John Jones had come to terms with the Charity Commissioners on the question of pooling the resources of the William and John Jones trust, the Wrexham Infirmary and the Wrexham and East Denbighshire War Memorial, in order to build a new infirmary at Roseneath, to replace the present one in Regent-street, at a cost of about £66,000.

SOUTH SHIELDS.—Further houses are to be built in the South Shields rural area. The Minister of Health has sanctioned the erection of 12 A type houses at Whitburn at a cost of £374 4s. 6d. per house complete, and 22 houses at Boldon Colliery of the same class at £336 14s. 6d. per house complete. The houses, it is understood, will be erected by the National Building Guild.

SWADLINCOTE.—Plans passed by U.D.C.: From the Vicar and churchwardens, Newhall, for a new vestry at St. John's Church, Newhall; Mr. T. Waterfield, for scullery, bread cooling room, &c., Regent-street, Church Gresley; Mrs. I. Till, house and premises, Bank Passage, Swadlincote; Mr. J. Tomlin, house, Commonside, Church Gresley; Mr. R. Atkins, bungalow, Windmill-street, Church Gresley; Mr. E. S. Eley, conversion of one house into two, Church-avenue, Church Gresley.

SWANSEA.—Plans passed by T.C.: Alterations and additions, Commercial Inn, Gower-road, Killay, for Mr. Perkins; bungalow, Mynyddbach-y-glo, for Mr. J. Hughes; house, Pentregethin-road, for Mr. George Turk; additions, Dillwyn-road, Sketty, for Mr. George Jones; garages, Glanmor-crescent, for Mr. T. Evans; additions, Greenfield Cottage, Heol-las, for Mr. D. Griffiths; bungalow, Bayswater-road, Sketty, for Miss L. T. Ricks; dairy and store, 109, St. Helen's-avenue, for Mr. G. Griffiths; house, Morriston Gas Works, for the Swansea Gas Co.; offices, Morriston Gas Works, for the Swansea Gas Co.; bungalow, West Cross-lane, for Mr. J. H. Jenkins; shop front, Walters-road, Uplands, for Mr. T. I. Chambers; two houses, Beechwood-road, for Mr. E. L. Tucker; roof over yard, Melbourne-place, for the British Thompson Houston Co., Ltd.; store, 37, Marlborough-road, for Mr. J. Davies; house, Clydach-road, Ynistawe, for Mr. W. Jones; additions, 103, St. Helen's-avenue, for Mr. N. Mainwaring; alterations and additions, Main-road, Mumbles, for Mr. W. Harris; wash-house, Gower-road, Killay, for Mr. M. A. Williams; bungalow, Graig-road, Morriston, for Mr. H. Bradley; additions, 9, Kingston-road, Coedsaeson, for Mr. Wm. Evans; house and shop, Birchgrove, Mr. David Ley; addition, Hafod Siding, for the Anglo-American Oil Co., Ltd.; bungalow, Bayswater-road, Sketty, for Mr. H. Williams; warehouse, Park-street, for Mr. E. Jenkins; two bungalows, Kilvey-hill, for Mr. John Dilling; bungalow, 7, Limeslade, Field 507, for Mr. W. J. Thomas; new road off Newton-road, Mumbles, for Messrs. W. & T. Beynon house, New Well-lane, Newton, for Mr. A. E. Gunning; additions to workshop, 7, Pinewood-road, for Mr. J. R. Cheley; bungalow, Gower-road, Killay, for Mr. B. Elliott; wash-house, Glan-yr-afon-road, for Mr. W. K. Jones; house, Salem-road, Landore, for Mr. D. Walters; bungalow, 5, Hoppe's Field, Western-lane, Mumbles, for Mr. I. Beynon; bungalow, 4, Hoppe's Field, Western-lane, Mumbles, for Mr. I. Beynon; house, Mary Twill-lane, Newton, for Mr. J. Bevan; additions, Waunarlwydd, Isha Farm, for Mr. Wm. Jones; house, Victoria-road, Waunarlwydd, for Mr. D. Evans; wash-house, Gower-road, Killay, for Mr. W. G. Connick; bungalow, Bayswater-road, Sketty, for Mr. J. G. Harris; bungalow, Bayswater-road, Sketty, for Mr. Bosbury; three houses, Sketty-road, for Mr. R. Jones; additions, Goitre Fawr-road, Dunvant, for Mr. Wm. Matthews; additions, Bethania Chapel, Woodfield-street, Morriston, for the Trustees; Cowshed, Overland-road, Mumbles, for Mr. J. F. Coonan; house, Carmarthen-road, Fforestfach, for Mr. T. Jenkins; wash-house, &c., 110, Oxford-street, for Mr. W. J. Rumney; two bungalows, Murton-road, Newton, for Mrs. T. Costa; house, Spencer-street, Brynhyfryd, for Mr. J. Jewell; additions to the English Congregational Chapel, Neath-road, Peniel Green, for the Trustees; store, 100, Cecil-street, for Mr. R. Roberts; garage, Chemical-road, Morriston, for Mr. E. C. Barter; garage, Edward-street, for Mr. G. C. Howell; two houses, Glynderwen-crescent, Lower Sketty, for Messrs. Griffiths & Kendall; shop front, 35, St. Helen's-road, for Messrs. Brightman, Ltd.; bungalow, Summerland-road, Newton, for Miss D. Griffiths; bungalow, Bayswater-road, Sketty, for Mr. T. J. Williams; bungalow, Bayswater-road, Sketty, for Mr. A. Stuart; bungalow, Derwen Fawr-road, Lower Sketty, for Mrs. M. Graig.

TYNEMOUTH.—A new building estate, nine acres in extent, is to be developed at Kenner's Dene, on which it is proposed to erect 78 semi-detached villas of pleasing design. Special attention will be paid to the lay-out of the estate, and each villa will have a garden. Already sites for 20 villas have been sold.

UCKFIELD.—Plan passed by U.D.C.: Alterations to "Holmwood," London-road, for Miss May.

FIRES.

ACTON.—A building in Hanbury-road, used for the storage of celluloid scrap by Mr. Henry Boddington, has been destroyed by fire, and several cottages in Holland-terrace, an adjoining thoroughfare, were damaged.

BALSALL HEATH.—An outbreak of fire has occurred on the premises of Mr. Joseph Richardson, wood-turner, Balsall Heath-road.

BODMIN.—The coach-building and repair shops of Messrs. Broad, Hender, & Scott, have been completely destroyed by fire.

BRADFORD. — Damage amounting to several hundred pounds has been caused by fire at Messrs. Grandage's Brownroyd Dyeworks, a branch of the Bradford Dyers' Association.

CHESTERFIELD.—A fire has occurred at Messrs. Robinson's bleach works, Walton.

DUNDEE.—A flax store belonging to Mr. George Henderson and the workshop of Messrs. G. & A. Low, joiners and funeral undertakers, and a store occupied by Messrs. Paterson, Sons & Co, music-sellers, have been destroyed by fire.

FORGUE.—As the result of a fire in the steading at the Home Farm of Auchaber, Forgue, Aberdeenshire, tenanted by Mr. J. M. Anderson, the mill building, straw and cart sheds, and stable were destroyed.

GLASGOW.—Damage amounting to over £50,000 was caused by a fire which occurred at the warehouse on the Clyde of Messrs. Falk, Stadelmann & Co.—The premises of Messrs. Thomas Paton & Co., hosiery manufacturers, 8, Falfield-street, have been destroyed by fire, and premises at 66, Bishop-street, Port Dundas, occupied by the Port Dundas Pottery Co., have been damaged by a fire. An outbreak of fire has occurred in premises at 26-28, Canal-street, occupied by Messrs. W. F. Uncles & Buchanan, fishcurers.

HAMILTON.—A disastrous fire has occurred at The Ross Mansion House, Hamilton, belonging to Colonel Robertson-Aikman, D.L. The present mansion house at The Ross is largely a modern building, and replaced some years ago a Georgian structure which dated back to 1788.

HARROGATE.—A serious outbreak of fire has occurred at the motor garage of the Bilton Motor 'Bus Company in Dragon-parade.

ILKLEY.—There has been an outbreak of fire at the West Riding County Council Sanatorium at Middleton, near Ilkley, causing damage which is provisionally estimated at between £1,500 and £2,000.

SCUNTHORPE.—A garage and general store in Lindum-street, the property of the Rill Tip Manufacturing Company, has been destroyed by fire.

SOUTHPORT.—A fire, causing damage estimated at about £1,000, has taken place at Ainsdale, at 675a, Liverpool-road, used by Mr. Fred North as a manufactory for poultry appliances, &c.

STAWELL.—As the result of a fire, Stawell School, Somerset, and the schoolhouse adjoining were completely destroyed.

THORNTON.—Fire broke out at Fosterton Farm, near Thornton, of which Mr. D. M'Pherson is tenant. The barn, threshing mill, and granary were almost completely destroyed.

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge.

	£ s. d.
Best Stocks	4 2 0
Second Hard Stocks	3 17 0

Per 1000, Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons, at King's Cross	3 1 0	Best Blue Pressed Staffs.	10 1 6
Do. grooved for plaster	3 3 0	Do. Bullnose	10 11 6
Do. Bullnose	3 16 0	Blue Wire Cuts	8 1 6
Best Stourbridge Fire bricks:—			
2½ in.	11 3 0	3 in.	13 2 0
GLAZED BRICKS—			
Best White, Ivory, and Salt Glazed Stretchers	24 0 0	D'ble Str'tch'rs	32 10 0
		D'ble Headers	29 10 0
		One Side and two Ends	33 10 0
Headers	23 10 0	Two Sides and one End	34 10 0
Quoins, Bullnose and 4½in. Flats	30 10 0	Splays and Squints	32 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.		
Thames Ballast	13 6	per yard,	delivered 2 miles radius Paddington.
Pit Sand	16 0	" "	
Thames Sand	16 6	" "	
Best Washed Sand	16 6	" "	
¾ in. Shingle for Ferro-Concrete	14 0	" "	
½ in. "	15 0	" "	
¾ in. Broken Brick	10 6	" "	
Pan Breeze	5 6	" "	

Per ton delivered in London area in full van loads.

	£ s. d.	£ s. d.
Best Portland Cement. British Standard Specification Test £3 3 0		£3 8 6

56/- alongside at Vauxhall in 80-ton lots.

Ferrocrete per ton extra on above	10 0
Roman Cement	8 15 0
Parian Cement	5 17 0
Keene's Cement, White	5 17 0
" Pink	5 12 0
Plaster, Coarse, Pink	3 10 0
" " White	3 17 6
" Fine	5 12 0
Sirapite, Coarse	3 16 0
" Finish	4 4 0
Grey Stone Lime	2 16 6
Chalk Lime	2 16 6
Best Ground Blue Lias Lime	2 18 6
Hair	17 0 0
Granite Chippings	1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s. 6d. if returned in good condition within three months, carr. pd.

Stourbridge Fireclay in s'cks 37s. 6d. per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	3 1
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube	3 4
Do. do. delivered on road wagons at Nine Elms Depot	3 5
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 7
Do. do. delivered on road wagons at above stations, per ft. cube	4 8
White basebed, 3d. per ft. cube extra.	

NOTE.—¼d. ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.

YORK STONE, BLUE—*Robin Hood Quality.*

	s. d.
Delivered at any Goods Station London.	
6 in. sawn two sides landings to sizes (under 30 ft. super.) Per Ft. Super	5 10½
6 in. rubbed two sides, ditto "	6 4½
3 in. sawn two sides slabs (random sizes) "	2 5½
2 in. to 2½ in. sawn one side slabs (random sizes) "	1 6½
1½ in. to 2 in. ditto, ditto "	1 4
HARD YORK—	
Delivered at any Goods Station London.	
Scappled random blocks Per Ft. Cube	6 0
6 in. sawn two sides landing to sizes (under 40ft. super.) Per Ft. Super	5 4½
6 in. rubbed two sides ditto "	6 0½
4 in. sawn two sides slabs (random sizes) "	2 10
3 in. ditto, ditto "	2 5½
2 in. self-faced random flags Per Yard Super	8 4

ARTIFICIAL STONE.

Delivered in London Area in full van loads.	s. d.
Plain	8 6 per ft. cube.
Moulded	10 0 " "
Cills	11 0 " "

WOOD.

GOOD BUILDING DEAL.

Inches	per stan.	Inches.	per stan.
4 × 11	£36 0	3 × 6	£22 10
4 × 9	30 0	3 × 11	35 0
4 × 8	30 0	2 × 11	35 0
4 × 7	30 0	3 × 9	35 0
3 × 8	30 0	2½ × 9	30 0
3 × 7	25 0	3 × 4½	20 10
2½ × 7	22 10	3 × 4	20 10

PLANED BOARDS.

1 × 11	42 10	1 × 9	37 10

PLAIN EDGE FLOORING.

Inches	per sq.	Inches	per sq.
¾	20/-	1½	32/6
¾	22/6	1½	44/-
1	25/-		

WOOD (*Continued*).

TONGUED AND GROOVED FLOORING. Inches	per sq.	MATCHINGS (BEST). Inches	per sq.
1	25/-	¾	17/6
1¼	32/6	¾	22/6
1½	44/-	1	25/-

Inches	BATTENS.	s. d.
¾ × 2		3 0 per 100 ft.

SAWN LATHS.

Per bundle				0	3 9
Dry Wainscot Oak, per ft. super, as inch	0	2 6	to	0	3 0
¼ in. do.	0	1 10½	to	0	2 6
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0	2 3	to	0	3 0
Cuba Mahogany	0	3 6	to	0	4 0
Teak (Rangoon, Moulmein or Java), per load	52	10 0	to	55	0 0
American Whitewood planks, per ft. cube	0	16 0	to	0	18 0
Best Scotch Glue per cwt	6	15 0	to	—	
Liquid Glue, per cwt.	4	7 0	to	5	10 0

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

	£ s. d.		£ s. d.
24 by 12	46 10 0	18 by 10	26 5 0
22 by 12	42 5 0	18 by 9	23 2 6
22 by 11	39 0 0	16 by 10	22 0 0
20 by 12	37 2 6	16 by 8	17 2 6
20 by 10	31 15 0		

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district	6 5 0
Ditto hand-made ditto	6 10 0
Ornamental ditto	6 15 0
Hip and valley tiles (per dozen) { Hand made	0 8 6
{ Machine made	0 8 0

METALS.

JOISTS, GIRDERS, &C., TO LONDON STATION PER TON—

	£ s. d.
R. S. Joists, cut and fitted	14 0 0
Plain Compound Girders	16 0 0
" Stanchions	18 0 0
In Roof Work	21 0 0

WROUGHT IRON TUBES AND FITTINGS—

(Discount off List for lot of not less than £15 net value delivered direct from Works. 5 per cent. less above gross discounts, carriage forward if sent from London Stocks.)

(all sizes).	Tubes.	Fittings, Up to 2".	Fittings, Over 2".	Flanges. Up to 2".	Flanges. Over 2"
Gas	55 %	50 %	55 %	60 %	65 %
Water	50 %	45 %	50 %	55 %	60 %
Steam	45 %	40 %	45 %	50 %	55 %
Galv'd—					
Gas	45 %	42½ %	47½ %	52½ %	57½ %
Water	37½ %	37½ %	42½ %	47½ %	52½ %
Steam	27½ %	32½ %	37½ %	42½ %	47½ %

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts plain	2½	2 5	2 11
2½ in. "	3 9½	2 8	3 8
3 in. "	4 5½	2 11	4 4
3½ in. "	4 10½	3 8	5 1
4 in. "	5 5	4 1	5 10

RAIN-WATER PIPES, &C.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	1 10½	1 4½	1 10½
2½ in. " "	2 1	1 7½	2 3
3 in. " "	2 6	2 0	3 0
3½ in. " "	2 11	2 4½	3 6
4 in. " "	3 5	2 10½	4 3

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices per yd.: 4 in., 5/3. .. 5 in., 6/9. .. 6 in., 8/-.

	Per ton in London. £ s. d.		£ s. d.
IRON—			
Common Bars	13 0 0	to	14 0 0
Staffordshire Crown Bars - good merchant quality	14 0 0	..	15 0 0
Staffordshire "Marked Bars"	16 0 0	..	17 0 0
Mild Steel Bars	12 0 0	..	13 0 0
Steel Bars, Ferro-Concrete quality, basis price	12 0 0	..	13 0 0
Hoop Iron, basis price	15 0 0	..	16 0 0
" Galvanised	29 0 0	..	31 0 0
Soft Steel Sheets, Black—			
Ordinary sizes to 20 g.	14 0 0	..	15 0 0
" " " 24 g.	15 0 0	..	16 0 0
" " " 26 g.	16 10 0	..	18 10 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality—			
Ordinary sizes, 6ft. by 2ft. to 3ft. to 20 g.	21 0 0	..	22 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.	22 0 0	..	23 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g.	24 0 0	..	26 0 0
Flat and Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 9ft. 20 g.	20 0 0	..	21 0 0
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	20 10 0	..	21 10 0
Ordinary sizes, 6ft. to 9ft. 26 g.	22 10 0	..	23 10 0

METALS (*Continued*).

	Per ton in London. £ s. d.		£ s. d.
Sheets Galvanised Flat, Best quality—			
Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker	24 0 0	..	25 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	25 0 0	..	26 0 0
Best Soft Steel Sheets, 26 g.	26 10 0	..	27 10 0
Cut Nails, 3in. to 6in. (under 3in. usual trade extras.)	23 0 0	..	24 0 0

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1/4 to 1/7 per foot super.

LEAD, &c.

	Delivered in London. £ s. d.		
LEAD—Sheet, English, 4 lb. and up	34 10 0	..	—
Pipe in coils	35 0 0	..	—
Soil Pipe	27 10 0	..	—
Compo pipe	38 10 0	..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

Old lead, ex London area, at Mills per ton	21 0 0	..	—
Do., ex country, carriage forward per ton	22 0 0	—	—
COPPER—			
Strong Sheet per lb.	0 2 3	..	—
Thin " "	0 2 4	..	—
Copper nails "	0 2 3	..	—
Copper wire "	0 2 4	..	—
TIN—English Ingots "	0 1 9	..	—
SOLDER—Plumbers' "	0 0 10	..	—
Tinmen's "	0 1 0	..	—
Blowpipe "	0 1 3	..	—

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	3½d.	32 oz. fourths	8½d.
" thirds	4½d.	" thirds	10d.
21 " fourths	5½d.	Obscured Sheet, 15 oz.	4½d.
" thirds	6d.	21 "	7d.
26 " fourths	6½d.	Fluted and 15 "	8½d.
" thirds	7½d.	Enamelled 21 "	10½d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
¼ Rolled plate	4½d.
⅛ Rough rolled	6d.
¼ Rough rolled	6½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic Arctic, Stippolyte, and small and large Flemish white	6½d.
Ditto, tinted	9½d.
Rolled Sheet	6d.
White Rolled Cathedral	5½d.
Tinted do.	7½d.

Cast Plate is same price as rough rolled.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil in pipes per gallon		0 3 5
" " " in barrels "		0 3 7
" " " in drums "		0 3 10
Boiled " " in barrels "		0 3 11
" " in drums "		0 4 1
Turpentine in barrels "		0 3 4
" in drums (10 gall.) "		0 3 7
Genuine Ground English White Lead, per ton (in not less than 5 cwt. casks.)		54 5 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt. lots per ton delivered		75 10 0
Red Lead, Dry (packages extra) per ton		38 0 0
Best Linseed Oil Putty per cwt.		0 17 0
Filocol per cwt.		0 15 6
Size. X D Quality		fkn. 0 3 6

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish Outside	0 14 6
Fine ditto ditto	0 16 0
Fine Copal ditto	0 18 0
Pale Copal ditto	1 0 0
Pale Copal Carriage ditto	1 4 0
Best ditto ditto	1 12 0
Floor Varnish Inside	0 18 0
Fine Pale Paper ditto	0 18 0
Fine Copal Cabinet ditto	1 2 6
Fine Copal Hatting ditto	1 0 6
Hard drying Oak ditto	0 18 0
Fine Hard drying Oak ditto	0 19 0
Fine Copal Varnish ditto	1 0 0
Pale ditto ditto	1 2 0
Best ditto ditto	1 12 0
Best Japan Gold Size	0 12 0
Best Black Japan	0 14 0
Oak and Mahogany Stain (water)	0 12 0
Brunswick Black	0 9 0
Berlin Black	0 14 0
Knotting (patent)	1 5 0
French and Brush Polish	1 2 6
Liquid Dryers in Terebine	0 12 6
Cuirass Black Enamel	0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	15	0
Add if in clay	" "	1	6
Add for every additional depth of 6 ft.	" "	0	9
Planking and strutting to trenches	per foot super	0	7
Do. to sides of excavation, including shoring	" "	1	2

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6	per yard cube	40	0
Add if in underpinning in short lengths	" "	9	0
Add if in floors 6 in. thick	" "	3	9
Add if in beams	" "	4	6
Add if aggregate 1 : 2 : 4	" "	11	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	3	6

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	34	0	0
Add if in stocks	"	8	10	0
Add if in Staffordshire blues	"	24	0	0
Add if in Portland cement and sand	"	3	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat struck or weathered joint	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	3
Setting ordinary register grates and stoves	each	1	1	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	5	5	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	7	6
Three-quarter-inch vertical damp course	" "	11	0
½ inch on flats in two thicknesses	" "	8	6
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	4

MASON.

		s.	d.
York stone templates fixed	per foot cube	16	3
York stone sills fixed	" "	28	6
Bath stone and all labour fixed	" "	12	0
Portland stone fixed	" "	21	6

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	79	9
Do. 20 in. × 10 in. Do. Do.	"	90	9
Do. 24 in. × 12 in. Do. Do.	"	99	0

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	5	6
Do. joists	" "	6	0
Do. roofs, floors and partitions	" "	6	6
Do. trusses	" "	8	6

		½"	1"	1½"	2"
Deal rough close boarding	per sq.	42/-	48/-	56/-	85/-

		s.	d.
Flat centering for concrete floor, including struts or hangers	"	60	0
Do. to beams	per ft. sup.	1	6
Centres for arches	"	2	0
Gutter boards and bearers	"	1	1

FLOORING.		½"	1"	1½"	1½"
Deal-edges shot	per sq.		49/-	58/-	67/-
Do. tongued and grooved	"		54/-	65/-	72/-
Do. matchings	"	45/-	55/-		
Moulded skirting, including backings and grounds	per ft. sup.	1/8	2/1	2/3	2/9

SASHES AND FRAMES.		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	10
Two Do. Do. Do.	" "	2	3
Add for fitting and fixing	" "	0	6
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights; average size	" "	4	0

DOORS.		1¼"	1½"	2"
Two-panel square framed	per ft. sup.	2/4	2/7	2/9
Four-panel Do.	"	2/8	3/0	3/3
Two-panel moulded both sides	"	3/0	3/3	3/6
Four-panel Do. Do.	"	3/3	3/7	3/10

CARPENTER AND JOINER—continued.

FRAMES.		s.	d.
Deal wrot moulded and rebated	per foot cube	14	0

		1"	1½"	1½"
Plain deal jamb linings framed	per ft. sup.	1/9	1/10	2/1
Deal shelves and bearers	"	1/6	1/8	1/11
Add if cross tongued	"	2d.	2d	2d

STAIRCASES.	1"	1¼"	1½"	2"	2½"
Deal treads and risers in and including rough brackets	2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed	1/8	2/-	2/2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1½ in.	per ft. run.	0	9
Mahogany handrail; average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	" "	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	17	0
Plain compound girders	"	20	0
Do. stanchions	"	23	0
In roof work	"	28	0

RAIN-WATER GOODS.

		3"	4"	5"	6"
Half-round plain rebated joints	ft. run	1/11	2/4½	3/7	4/-
Ogee Do. Do.	"	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	"	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	56	0
Do. Do. in flats	"	52	0
Extra labour and solder in coated cesspools	each	7	4
Welt joint	per ft. run.	0	6
Soldered seam	" "	1	10
Copper nailing	" "	0	7

		½"	¾"	1"	1½"	2"	4"
Drawn lead waste	per ft. run	10d	1/6	1/9	3/1	3/10	
Do. service	"	1/5	1/11	2/3	3/6		
Do. soil	"						6/2
Bends in lead pipe	each					3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"				14/7	19/6	
Bib cocks and joints	"	6/4	9/7	15/4	41/-		
Stop cocks and joints	"	15/4	17/2	25/8	64/-		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	2	9
Do. Do. Sirapite	" "	2	11
Do. Do. Keen's	" "	4	0
Add sawn lathing	" "	1	7
Add metal lathing	" "	2	10
Portland cement screed	" "	2	1
Do. plain face	" "	3	9
Mouldings in plaster	per 1 girth	0	3
One-and-a-half granolithic pavings	per yard sup.	6	4

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	1	1
26 oz. Do.	" "	1	4
Obscured sheet	" "	1	8
¼ in. rolled plate	" "	1	0
¼ in. rough rolled or cast plate	" "	1	1
¼ in. wired cast plate	" "	1	7

PAINTER.

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	1	0
Knotting and priming	" "	0	8
Plain painting 1 coat	" "	0	11
Do. 2 coats	" "	1	7
Do. 3 coats	" "	2	4
Do. 4 coats	" "	3	0
Graining	" "	2	5
Varnishing twice	" "	1	11
Sizing	" "	0	4
Flatting	" "	0	8
Enamel	" "	1	3
Wax polishing	per foot sup.	0	9
French polishing	" "	1	3
Preparing for and hanging paper	per piece	2/- to 4/-	

* These prices apply to new buildings only. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 11 should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

TRADE NEWS.

Messrs. John Hunt & Sons, Waterloo-road, Smethwick, are carrying out the tar paving of the open market at Cape Hill, Smethwick.

We have received a copy of the new price list of the Triplex Foundry, Ltd., Great Bridge, Staffordshire.

B.R.C. Fabric, made by the British Engineering Co., Ltd., of Manchester, has been used for reinforcing the concrete road foundation in Piccadilly-circus.

We have received from Messrs. Cafferata & Co., of Newark-upon-Trent, a copy of their booklet, giving fixing instructions for the firms' reinforced plaster slabs.

Messrs. D. Anderson & Son, Ltd., of Manchester, London and Belfast, makers of the "Belfast" roofs, roofing felts, and "Sidol" wood preservative, have established their administrative headquarters at Manchester, where all correspondence should be addressed.

"Asphaltic Slag for Roads," the slag tarmacadam manufactured by Messrs. William Shepherd & Sons, Ltd., Milkstone, Rochdale, is being used by Chadderton U.D.C., Crayford U.D.C., Kiveton Park R.D.C., and Amersham R.D.C.

Messrs. J. Sagar & Co., Ltd., Canal Works, Halifax, Yorks, have sent us a descriptive leaflet relating to their new single spindle dimension sawing machine for rapid and economical sawing to accurate dimensions, squaring off, mitreing, bevelling, cross-cutting, rebating, cutting obtuse or acute angles. The machine is suitable for manufacturers of household, office, library and school furniture, electric fittings, plate, scientific, drawing instrument cases, and small cabinet and joinery work.

We have received from the General Electric Co., Ltd., the 20th edition of section L (1) of their complete catalogue which gives particulars of electric bells and accessories. This comprehensive list includes electric bells of the ordinary domestic type, special types of bells for signalling, traction and mining use, alarm bells, indicators, relays, pushes, and burglar alarms. A section is devoted to cells both wet and dry, battery materials, terminals and other accessories, and a third portion deals with lightning conductors. The prices in this list have been revised to include all reductions in cost of labour and materials, etc., to date. Copies can be obtained on application to Magnet House, Kingsway, or any of the numerous G.E.C. Branches.

We have received particulars of tipping bodies made by Messrs. Tuke & Bell, Ltd. (Carlton Engineering Works, Lichfield), who are manufacturing "either-side" and end-tipping bodies on Ford chassis of different types to suit user's requirements. The type "B" body has a capacity of 41 cu. ft., a loading height of 4 ft. 4 in. only (which is less than the loading height of many non-tipping bodies), and by reason of the design of the tipping gear the tare weight of the body is low without in any way weakening the construction. The principle of the tipping gear is that the body is traversed on friction rollers towards the rear of the chassis or, in the case of the "either-side" tipping body, towards the side of the chassis to a point where the body and load are balanced; when this position is reached the body is tipped to an angle of 45 deg. and controlled by toggles, the unloading of 1 ton of material only taking one man 35 secs. In the normal position the rear of the body is secured rigidly to the chassis by means of bridles at each side, and the front of the body is held in position by taper pins engaging in eye-bolts. The tipping gear is bolted on to the chassis in one unit, and is designed for lightness, rapidity of action, and freedom from breakdown due to wear, no portion of the load being carried on the tipping gear, but on friction rollers of suitable strength. In addition to these 1 ton capacity bodies, Messrs. Tuke & Bell, Ltd., are also manufaoturing tipping bodies up to 5 tons capacity.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him not later than Tuesday evening.

***Denotes accepted.** † **Denotes provisionally accepted**
‡ **Denotes recommended for acceptance.**
‖ **Denotes accepted subject to modifications.**

BARNET.—For the erection of 12 houses on the Underhill site, for the U.D.C. :—

*H. W. Cole, Newport Pagnell....	£4,047

BARNSLEY.—For making private street and back roads, for the T.C. The Borough Engineer, Fairfield House Offices, Barnsley :—

A. Bedford, Barnsley—	
Sycamore-street	£599 10 8
Back Sycamore-street	203 17 0
Back Myrtle-street	251 0 0
Back road of Sykes-avenue ..	153 17 0
F. Taylor, Barnsley—	
Myrtle-street	710 0 0

BARNSLEY.—For the erection of 20 houses on the Wilthorpe site, for the T.C. :—

*W. Dunk & Sons .....£348 17 6 per house.	

BRUTON.—For erection of a memorial hall, library and classrooms, for the Governors of the King's School. Mr. A. J. Pictor, F.R.I.B.A., architect and surveyor, Bruton. Quantities by architect :—

H. Butt & Sons, Wincanton ..	£18,160 13 1
John Merrick, Glastonbury ..	17,991 0 0
Wort & Way, Salisbury	17,571 0 0
T. S. Hobbs, Bruton	17,293 16 10
R. Butcher & Sons, Warminster	17,225 8 0
F. R. Bartlett, Ltd., London..	17,072 0 0
Erwood & Morris, Bath	16,982 0 0
W. Burston, Clevedon	16,629 17 6
E. H. Burgess, London	16,603 18 9
C. Addicott & Son, Weston-super-Mare	16,433 4 3
Wright & Son, Glastonbury ..	16,364 1 11
E. G. Padfield & Co., Shepton Mallet	16,175 0 0
Parsons Bros., Westbury	16,167 5 9
Hayward & Wooster, Bath ..	15,907 0 0
W. Parsons, Crewkerne	15,864 2 11
R. G. Spiller, Sherborne	15,490 0 0
National Building Guild, Manchester	15,426 0 0
A. Wills & Son, Bath	15,423 0 0
E. Chancellor & Sons, Bath ..	15,394 10 8
Bird & Pippard, Ltd., Yeovil	15,277 17 0
C. T. Tucker, Bristol	15,115 8 1
W. F. Drew, Ltd., Stroud	15,004 0 0
F. J. Blackmore & Son, Bath	14,820 0 0
Long, Jacob & Sons, Ltd., Bath	14,603 0 0
Jenkins, Hitt & Grant, Weymouth	14,486 3 7
Theo. Conway, Ltd., Weymouth	14,376 19 4
Hy. Pittard & Son, Langport..	13,726 0 0
Coles Bros., Ltd., Peasedown-St. John, Bath	13,250 0 0
Dunthorn, Ltd., Glastonbury	13,127 0 0
Saunders & Sons, Ltd., Cirencester	12,900 0 0

CLAYPOLE (LINCS.).—For the erection of village hall, caretaker's rooms, boundary fences, gates, &c., for Mr. H. Coulby, Cleveland, Ohio, U.S.A. Mr. H. R. Rushbrooke, architect and surveyor, 4, Spring-gardens, Newark-on-Trent. Quantities by architect :—

		Time Months
T. Barlow & Co., Ltd., 12, Beauville-road, Nottingham	£3,731 0 0	—
W. F. Baines, N. Hykeham, Lincoln	3,541 4 7	—
Thomas Bow, 49, Lamartine-street, Nottingham.....	3,383 0 0	—
Rudd & Son, Ltd., Wharf-road, Grantham	3,376 5 0	—
P. Kettle & Co., Cross-street, Peterborough	3,283 13 0	5 to 6
Thornhill Bros., Cecil-street, Lincoln	3,258 0 0	5
J. Coppin & Son, Carlton, near Nottingham	3,178 17 6	6
John Bush, 29, Radford-road, Nottingham	£3,147 10 0	9
F. M. Thompson & Sons, Ltd., Eve-street, Louth	3,084 12 6	6
G. H. Blighton, 107, Milligate, Newark	3,054 0 0	3 to 4
*G. Brown & Son, 65, London-road, Newark	3,051 10 0	4
William Smith, 37, Milligate, Newark	2,990 10 0	7
S. & R. Horton & Son, Portland-street, Lincoln	2,917 10 0	—

* Accepted tender on basis of time limit.

DUNMOW.—For erection of Territorial Drill Hall :—

*Myall Bros., Southend	£3,000

ESHER.—For erection of detached cottage at Lower Green, for the Esher and Dittons U.D.C. Mr. Horace C. Fread, Surveyor, Council Offices, Esher :—

Wheatley & Sons, East Molesey ..	£862 19
A. Hossack, Tolworth	825 0
C. Higby, Ltd., Claygate	795 0
E. Potterton, East Molesey	692 0
A. Martin & Sons, Esher	676 17
*Rutherford & Fulford, Surbiton	575 0

ESHER.—Erection of house on sewage farm for the U.D.C. :—

Rutherford & Fulford, Surbiton.....	£575

GARMOUTH.—For making and repair of some 700 yards of roads at Kingston. Mr. Alexander Hogg, County Road Surveyor, Elgin :—

*Alexander May, Elgin	£132 10

HAMMERSMITH.—For paving carriageways and footways on the Old Oak Estate, for the B.C. Mr. R. H. Clucas, Borough Engineer and Surveyor, Town Hall, Hammersmith :—

W. Shepherd & Sons, Lancs...	£20,169 3 1
H. Elliott & Co., Ealing	16,756 7 0
P. Shepherd & Co., London ..	16,165 10 0
W. Griffiths & Co., London ..	16,055 12 10
Cole & Son, London	16,049 11 9
H. Woodham & Son, London	15,722 5 1
G. Wimpey & Co., London ..	15,625 0 0
J. Mowlem & Co., London....	15,225 5 2
R. Merton Hughes, London..	14,481 0 0
*W. Walkerdine, Ltd., Kensington.....	13,619 2 4

HOLYWELL.—For alterations and additions to the Vicarage. Mr. Gronwy R. Griffith, architect, 2, Post Office-lane, Denbigh :—

Edwin Hughes & Son, Holywell ..	£1,260 10
T. Charles, Holywell	675 0
J. L. Williams, Holywell	535 0
*G. Pierce & Sons, Holywell	505 0

LITHERLAND.—For construction of a 30 in. diameter reinforced concrete pipe sewer, for the U.D.C. Mr. George Ponsford, Surveyor, Council Offices, Litherland :—

R. Castain & Sons, Blundellsands	£3,370 0 0
R. Taylor & Sons, Ormskirk ..	3,350 10 0
Chandler Bros., Manchester ..	3,378 15 0
P. E. Woods, Bootle	3,470 0 0
Lawrence Marr & Sons, Liverpool	3,385 12 0
Rimmer Bros., Liverpool	3,395 0 0
Walter Jowett, Prescott	1,789 0 0
F. Chappell, Liverpool	3,423 0 0
W. Turner, Newcastle	3,900 0 0
T. Milburn, Bootle	1,770 12 0
A. Graham & Sons, Huddersfield	3,284 5 6
J. J. Blackburn, Patricroft..	1,595 0 0
A. Monk, Irlam	2,300 0 0
Alex Hyslop, Manchester	3,266 0 2
Peter Balmer & Sons, Aintree..	2,330 0 0
W. F. Chadwick, Ltd., Liverpool	2,610 16 6
Edmund Taylor, Blackpool ..	2,714 9 0
Williams & Kilshaw, Seaforth	1,850 0 0
Campbell, Kenyon & Co., Acton	1,625 14 0
*Unit Construction Co., Liverpool	1,674 0 6

LETCHWORTH.—For making up roads and construction of sewers, for the U.D.C. Mr. G. T. Hill, Surveyor, Council Offices, Letchworth :—

	Storm Water Sewers. Total.	Glebe Road. Part 1.	Glebe Road. Part 2.	Cromwell Green.	Total amount of P.S.W. Contract
Howard Farrow, Golders Green	£2,179 3 6 ..	£1,670 18 8 ..	£1,536 14 9 ..	£461 5 9 ..	£3,668 19 2
Thos. Higgs, Northampton	1,211 0 0 ..	1,948 0 0 ..	2,193 0 0 ..	606 0 0 ..	4,747 0 0
G. P. Trentham, Ltd., Birmingham	1,572 2 3 ..	1,410 0 0 ..	1,200 0 0 ..	343 0 0 ..	3,053 0 0
Thos. N. Pedrette, Enfield	1,551 8 6 ..	1,589 14 8 ..	1,843 10 0 ..	522 0 0 ..	3,955 4 8
T. A. Rainbow, Upper Edmonton	1,719 10 9 ..	1,777 17 4 ..	1,888 14 9 ..	544 10 0 ..	4,211 2 1
W. Shepherd & Sons, Rochdale	—— ..	1,572 1 7 ..	1,606 10 6 ..	466 11 6 ..	3,645 3 7
S. E. Moss, Southend	1,958 17 0 ..	1,471 0 0 ..	1,627 0 0 ..	465 5 0 ..	3,563 5 0
W. Manders, London	1,297 18 7 ..	1,303 5 8½ ..	1,357 3 10 ..	394 16 2 ..	3,055 5 8½
R. Parker, Norton.....	1,455 4 2 ..	1,450 10 0 ..	1,321 6 8 ..	382 17 0 ..	3,154 13 8
H. J. Jackson, Biggleswade	1,252 16 5 ..	1,329 10 7 ..	1,428 0 0 ..	407 2 0 ..	3,164 12 7
*S. H. Greasby, Leicester ..	1,425 17 6 ..	*1,200 17 9 ..	*1,203 3 0 ..	*369 3 0 ..	2,773 3 9
Roads and Public Works, Westminster	1,300 14 3 ..	1,445 6 3 ..	1,288 2 0 ..	368 11 0 ..	3,101 19 3
Campbell, Kenyon & Co., Acton	1,509 12 6 ..	1,629 17 4 ..	1,625 2 0 ..	470 3 0 ..	3,725 2 4
*C. Pearce, Letchworth	*1,115 18 0 ..	1,311 10 9 ..	1,507 8 0 ..	419 9 2 ..	3,238 7 11
J. Ray, Letchworth	1,305 17 11 ..	1,779 7 10 ..	1,956 0 10 ..	555 2 9 ..	4,290 11 5
G. Morris Pugh, Letchworth	1,227 7 0 ..	1,300 13 7 ..	1,346 1 6 ..	375 15 6 ..	3,022 10 7
R. Castains & Sons, Blundellsands.....	1,153 4 3 ..	1,242 1 1 ..	1,209 19 6 ..	352 7 6 ..	2,804 8 1
W. Richards, London	1,281 14 3 ..	1,290 19 2 ..	1,328 0 0 ..	353 8 0 ..	2,972 7 2
W. Thompson, Luton	1,368 0 0 ..	1,602 1 8 ..	1,413 16 9 ..	414 7 6 ..	3,430 5 11
S. A. Smith.....	1,457 2 9 ..	1,339 0 6 ..	1,266 10 0 ..	353 16 6 ..	2,959 6 6

LONDON.—For reconstruction of premises at No. 125, Edgware-road and No. 12, Burwood-place, London, W. Messrs. Bridgman & Bridgman, architects, Torquay. Quantities by Mr. E. R. Bobbs, 10, Old Burlington-street :

J. Carmichael (Contractors), Ltd.	£13,250
C. Miskin & Sons, Ltd.	13,218
G. Parker & Sons, Ltd.	13,031
J. Jarvis & Sons, Ltd.	12,928
Higgs & Hill, Ltd.	12,727
H. A. Murphy & Co.	12,399
H. V. Clogg	11,908

LONDON.—For provision of new boiler and calorifiers, for the Church-street baths, for the Camberwell B.C. :—

†Babcock & Willcox, Ltd. (boiler and soot blower)	£1,035
†Royles, Ltd. (calorifiers)	366

ORSETT.—Alterations at the Workhouse, for the Board of Guardians :—

*Matthews & Shaw	£250

ROMSEY.—For the erection of a cottage in Winchester-road, for the Misses Symes. Mr. W. C. Roles, architect, Awbridge, near Romsey :—

F. W. Collins & Son	£598 0 0
*G. F. Hurst & Sons	557 11 0

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*C. & F. Gaen, Port Talbot	£670

TERRINGTON ST. CLEMENT, NORFOLK.—For erection of a bungalow, Pope's-lane, for Mr. H. Fisher. Mr. T. F. Parker, architect and surveyor, 3, Market-street, Wisbech. Quantities by architect :—

Hornigold & Morton, Terrington	£653 5 0
H. W. Reeder, Terrington St. John	624 0 0
King & Eyre, Sutton Bridge	618 8 9
Hugh Rilett, Terrington	585 0 0
Z. Hiss, Wisbech	585 0 0
Wright & Wilson, Terrington	575 0 0
T. J. Jupp, Wisbech	562 14 0
*R. & J. Eggleton, Terrington	495 10 0

TORQUAY.—For alterations to motor garage at "Gardenways," for Mr. H. H. Barnett. Messrs. Bridgman & Bridgman, architects, Torquay :—

A. Rowe, Paignton	£863 17
C. & R. E. Drew, Paignton	852 5
*R. Wilkins & Sons, Ltd., Torquay	761 10

TORQUAY.—Alterations at Nos. 92, 94, and 96, Union-street. Messrs. Bridgman & Bridgman, architects, Torquay. Quantities by Mr. G. S. Harris, Torquay :—

R. F. Yeo & Sons, Torquay	£5,240 0 0
S. Hawkins & Son, Torquay	4,950 0 0
S. Eales & Son, Torquay	4,850 0 0
R. E. Narracott, Torquay	4,737 13 11
The National Building Guild, Manchester	4,721 18 0
T. J. Stanbury, Torquay	4,623 0 0
T. Vanstone & Son, Torquay	4,589 0 0
Wholesale Co-op. Soc., London	4,378 0 0
E. P. Bovey & Son, Torquay	4,357 0 0
H. C. Jackman, Torquay	4,186 8 10
*R. Wilkins & Sons, Ltd., Torquay	3,945 0 0

TORQUAY.—For new shop fronts at Nos. 92, 94 and 96, Union-street. Messrs. Bridgman & Bridgman, architects, Torquay :—

E. Pollard & Co., Ltd., London	£1,653 0
A. Edmonds & Co., Ltd., London	1,626 0
*F. Sage & Co., Ltd., London	1,597 10

TORQUAY.—For motor garage at The Hydro. Messrs. Bridgman & Bridgman, architects, Torquay. Quantities by Mr. G. S. Harris :—

J. C. & W. Watson	£2,995 0
E. P. Bovey & Son	2,887 0
T. Vanstone & Sons	2,645 10
R. Wilkins & Sons, Ltd.	2,635 0
— Green	2,575 10
R. F. Yeo & Sons	2,495 0

WORSBOROUGH.—For construction of earthenware pipe drains and cast-iron pipe drain, for the U.D.C. Mr. T. Shield, surveyor, Saville House, Worsborough Bridge :—

—. Swinbourne, Hoyland, Barnsley	£3,051 9 8
W. Guest, Blucker Hill, Barnsley	1,885 16 0

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Ralph Porter, Worsboro' Dale | 1,625 18 7
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S. Deeley, Ryhill, Royston | 1,618 2 0
C. Wade, Luddenden Foot, Halifax | 1,615 17 3
W. S. Royce, Leicester | 1,602 7 9
G. H. Mellor, Doncaster-road, Barnsley | 1,525 0 0
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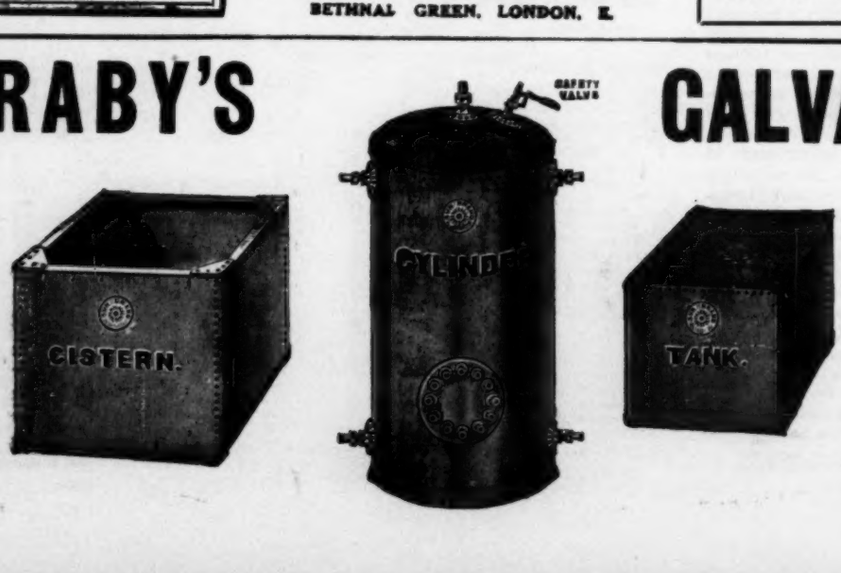

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